Patterns of the PRICE vowel in Liverpool English: History, Phonetics, and Corpus Phonology

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Abstract

Previous work on the Liverpool dialect has established that the PRICE vowel has an interesting phonological pattern; even so, there has never been a comprehensive study to confirm this claim. This dissertation provides an exploration of the PRICE vowel in Liverpool English through a corpus phonology approach. The present study finds that in the Liverpool dialect there are five PRICE vowel phonological patterns with a combination of four variants in three environments. These variants are: a raised nucleus diphthong, non-raised nucleus diphthong, lengthened nucleus diphthong, and monophthong; and the conditioning environments are: before voiceless obstruents, voiced obstruents, and nasal consonants. A striking observation is that the phonological patterns seem to have restrictions on variant combinations, which supports the hypothesis that Liverpool English has phonological patterns, rather than a number of variants available for each environment independent of the other variants. Specifically, there is no phonological pattern with a raised variant that does not have a monophthongal variant. Furthermore, an informant who produces a monophthong in the voiced environment necessarily has a monophthong before nasal consonants. The results of the present study may also suggest that there is phonological change in progress in the Liverpool PRICE vowel as two of the phonological patterns are produced exclusively by younger females. Many previous studies have suggested that younger women are the innovators in linguistic change. Finally, this dissertation takes a novel approach in explaining the origins of the PRICE vowel raising patterns. Three of the current theories on the origins of raising patterns in English are evaluated and combined in a way that encompasses the subfields of historical linguistics, phonology and dialectology in the final explanation.

Acknowledgments

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Joos' (1942) study on "Canadian Raising" provided the first detailed account of a phonological pattern with the PRICE vowel. Since Joos there has been a vast amount of research of PRICE vowel raising patterns in different varieties of English (see Labov 1963, Chambers 1973, Trudgill 1986, Britain 1997, Britain and Trudgill 2005, and Thomas 2000). These studies have focussed on numerous varieties in both the United Kingdom and North America. Knowles' (1973) in his PhD dissertation mentioned the possibility of a phonological pattern involving the PRICE and MOUTH vowels in Liverpool English. Following Knowles first study, linguists working within Liverpool English have continued to assert that Liverpool English (LE) has a potentially relevant phonological pattern in the PRICE and MOUTH vowels (see Honeybone and Watson 2006, Watson 2007). Despite this assertion, there has never been a systematic investigation to determine the precise phonological pattern. The purpose of this dissertation is to explain the details of the PRICE vowel phonological pattern in LE utilising a number of corpus samples, and to evaluate the effectiveness of corpora in phonological research. Although the PRICE and MOUTH vowels are generally analysed together, I have chosen to limit my current study to PRICE vowel tokens, leaving the MOUTH set to potential follow-up study. Gregg (1973) suggests that there is evidence from current dialects of English that the diphthongisation of ME **ī** (modern-day PRICE vowel) and ME **ū** (modern-day MOUTH vowel) developed separately. There are also a number of different phonological pattern which include the PRICE vowel but not the MOUTH vowel (Moreton and Thomas, Britain and Trudgill 2005). Furthermore, focussing on the PRICE vowel ensures the precise phonological details have been meticulously analysed in this dissertation.

Chapter 1 provides an introduction to LE including the sociological perceptions, history of the development, and common dialect characteristics. This section also includes a description of the PRICE vowel in English varieties and a review of the previous literature on PRICE vowel phenomena and raising patterns. Methodology is discussed in Chapter 2, with specific reference to speech samples, elicitation, and corpus phonology. As well as a detailed description of the analysis methods used. Chapter 3 is a presentation of the findings of this study, including a detailed description of the allophonic variation and the relevant environments. Included in this section a summary of result based on certain sociological factors. A comparison of the finding of the present study with PRICE vowel phonological patterns in other varieties of English is given in Chapter 4. This chapter also provides an evaluation of the usefulness of corpus samples and their effectiveness in phonological research in comparison to elicited speech samples. Chapter 5 is a discussion of the current theories on the origins of raising patterns in English. Final comments, conclusions and possible future directions are presented in Chapter 6.

1. Introduction

1.1 'Scouse'

Liverpool English, commonly known as 'Scouse' (Knowles, 1973: 14), is a dialect of English spoken in the north-west of England; most speakers live in Liverpool, the surrounding areas of Birkenhead and Merseyside (Honeybone and Watson, 2006: 2). Although there is the popular belief that LE is mainly an urban dialect, studies suggest that the Liverpool dialect is spreading into rural areas of 'new' Merseyside (Honeybone, 2007: 110). Knowles (1973: 14) specifically notes that LE is spreading to the areas of Southport, Maghull, Lydiate, Ormskirk, St. Helens, Runcorn, Widnes, and the Wirral.

Trudgill (1990: 69) asserts that the Liverpool dialect is distinctive and well-known to British speakers. Montgomery (2007) tested three subject groups on distinct dialects of English in order to determine which dialects were easily identifiable to the participants. The participants were mostly post-GCSE students from six-form colleges taken from the areas of Crewe, Carlisle, and Hull. According to Montgomery (2007: 172), the Scouse dialect is well-recognised by all three subject groups. More recently, Watson and Clark (2011) conducted a study using a continuous participant response device[1] in order to track participants' reactions to different dialects of English. With only four to five seconds of LE audio stimulus, 30 per cent of the participants reacted dramatically similar to other well-recognisable dialects.

Although the Liverpool dialect is well-recognised by British speakers, it is also perceived as a stigmatised dialect (Hamer 2007: 175) or one of low "aesthetic" rating according to Honeybone (2007: 110). An extensive study by Giles (1970: 214) evaluates attitudes held by 177 British English school children aged 12 to 17 toward 16 varieties of English. The varieties were both standard and regional from the United Kingdom and North America as well as some foreign accents (Giles 1970: 215). Participants rated the speech samples for aesthetic appeal, communicability, and social status. LE is consistently assessed negatively (Giles 1970: 218), as are other 'urban' dialects, such as the Birmingham dialect. Coupland and Bishop (2007: 76) supplement Giles original study using 34 different accents of English and 5010 participants ranging in age from 15 to 65. Similarly to Giles' findings, the results show that LE is rated very low on social attractiveness and prestige (Coupland and Bishop 2007). The lowest score possible for the evaluated dialects was 34. With this in mind, the Liverpool dialect is rated as 30 out of 34 for social attractiveness and 31 out of 34 for prestige (Coupland and Bishop 2007: 79).

[1] Participants provided real-time judgments of the speech sample by using a magnitude continua method (Watson and Clark 2011).

Furthermore, Montgomery's (2007: 179) study finds that on purely non-linguistic characteristics, such as attributes and comprehensibility, informants show overwhelmingly negative responses to LE. As the informants had some previous knowledge of linguistics, they were asked to rate Scouse on positivity/negativity of linguistic features in their opinion; the informants overwhelmingly assess Scouse as linguistically negative (Montgomery, 2007: 180). It appears that LE speakers are aware of how well-known the dialect is, and of the common views held about it. There are two speech samples used for analysis in this dissertation which have informants discussing the negative perception that other British English speakers have of LE.

It is somewhat unexpected that the Liverpool dialect is a fairly new dialect, given the social notability and reputation of LE. Knowles (1973) uses evidence from historical texts, such as Ellis' *Early English Pronunciation*, to date the formation of LE sometime between 1830 and 1889. Wells (1982: 371) writes that LE was formed in the nineteenth century coinciding with the considerable immigration of Irish and Welsh speakers. Based on the analysis of particular phonological characteristics, Honeybone (2004, 2007) provides a detailed account of the development of LE using Trudgill's (1986) theory of 'new-dialect formation'. According to the new-dialect formation theory there are three stages of development of a new dialect, Honeybone (2007: 119) describes the three stages that LE went through to become a dialect separate from the South Lancashire dialect spoken in other parts of the region. The first stage, which Honeybone sets to be broadly pre-nineteenth century, is a pre-dialect formation stage, where there is no evidence that the characteristics thought to be LE were observed (or documented) by contemporaries. The dialect formation process or the second stage is dated mid-nineteenth century. Honeybone, following the new-dialect formation theory, further divides it into three interrelated parts. This stage is the most complex one; it is the period when a generation begins to have observable phonological differences from its parents' generation. Stage 2i, as Honeybone (2007: 119) refers to it, occurs when there is dialect mixture, which is the result of significant immigration in the case of LE. In stage 2ii koinéisation begins and the younger generations show inter-dialect characteristics. A stable koiné is established in the 2iii stage. Broadly post-nineteenth century is marked as the final stage of the dialect formation (Honeybone, 2006: 119). In this stage, it is assumed that a 'distinct' dialect variety has been formed similar to modern day LE (Honeybone, 2007: 119). The final stage is thought to be an on-going process, as dialects may change linguistically over time.

The following section identifies some of the phonological features LE has in common with other northern English dialects and also a number of uniquely Liverpudlian characteristics.

1.2 Phonological Characteristics

The phonological features of LE reflect both the distinctiveness of the dialect and the similarities with the neighbouring dialects. Watson (2007: 3) demonstrates that LE has a very standard consonant and vowel phonemic structure, as shown in the consonant (Figure 1) and vowel (Figure 2) phoneme inventories for LE below.

	Bilabial	Labio-dental	Dental	Alveolar	Post-Alveolar	Palatal	Velar	Glottal
Plosive	p b			t d			k g	
Affricate					tʃ dʒ			
Nasal	m			n			ŋ	
Fricative		f v	ϴ ð	s z	ʃ ʒ			h
Approximant				r		j	w	
Lateral approximant				l				

Figure 1. Consonant Phonemes (Watson 2007: 2)

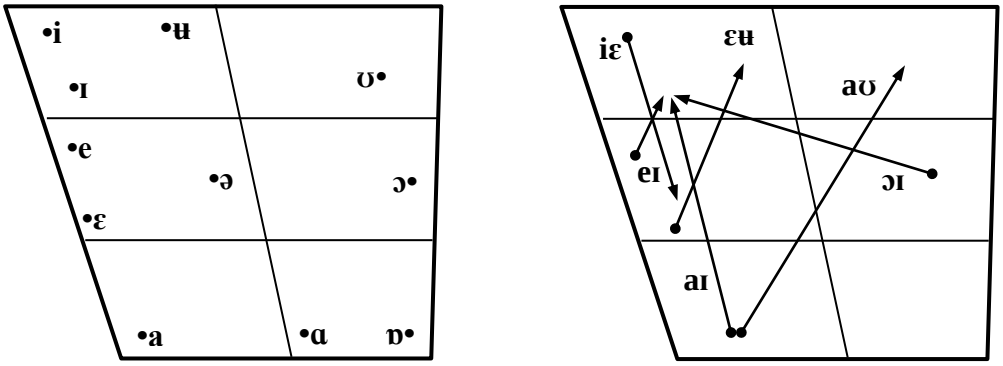

Figure 2. Vowel Phonemes (Watson 2007:7)

While at a phonemic level LE does resemble many other varieties of English and it does share some similar feature to the Northern varieties of English, there are also phonological characteristics which differentiate it from other northern Englishes. First let us consider the phonological properties which relate LE to other neighbouring varieties. Wells (1982: 365) claims that many dialects of English have a word final velar nasal [ŋ] in words such as *sing, long,* and *gang.* Conversely, in some north-western Englishes, including LE, the velar plosive is retained word finally resulting in the following pronunciation: [ŋg] (Wells, 1982: 365). This feature is called the 'velar nasal plus'. Honeybone (2007) marks this feature as one which has

entered LE through other north-western varieties. Knowles (1973: 293) and Wells (1982: 365) further suggest that the [ŋg] sequence occurs preceding a suffix-initial vowel, as seen in *singing* [sɪŋgɪŋg], while Wells (1982: 365) shows *singer* [sɪŋgə] and adds that the [ŋg] segment also occurs preceding a liquid, as in *kingly* [kɪŋglɪ]. However, Honeybone (2004: 7) asserts that the 'velar nasal plus' "may not have been simply taken into the koiné wholesale". This is demonstrated by Knowles (1973: 293), Wells (1982: 365), and Watson (2007: 3) including [sɪŋgən] as another likely realisation of the final –ing morpheme. Interestingly, this may lead to the conclusion that there is no underlying /ŋ/ phoneme, but rather that it is an allophone of /n/. That is to say, [ŋ] can be accounted for through place assimilation to the following [g], as evidenced by the [ən] in [sɪŋgən] and the observation that [n] and [ŋ] are in complementary distribution. There is a vast amount of discussion regarding whether the velar nasal is phonemic, and therefore included in phonemic inventories, or an allophone of /n/ and excluded from inventories (see Wells 1982, Smith 1982, Booij et al. 2000, Flemming 2003, Roach 2009). This debate is especially relevant for those varieties which exhibit the 'velar nasal plus'. I chose to represent the phonemic inventory as presented by Watson (2007) and therefore include the velar nasal. That said I am not making any explicit claims as to the phonemic/allophonic status of this speech sound.

Another feature LE has in common with other varieties of northern English is the maintained length of [u] preceding a [k] in words such as look, book, and book. Knowles (1973) shows that this is a working-class feature of the Liverpool dialect and Honeybone (2004) suggests that this is a prominent characteristic of contemporary LE. While Watson (2007) and Honeybone and Watson (2006) propose that this pattern is declining in younger speakers of LE, and therefore may be on the decline in LE.

Knowles (1973: 295), Wells (1982: 372), Honeybone (2004: 8), Honeybone and Watson (2006: 7), Watson (2007: 8), and Honeybone (2007: 127) all observe that LE does not have the NURSE SQUARE distinction found in many other varieties of English. In these varieties, the vowel in the NURSE lexical set has a contrast with the vowel in the SQUARE lexical set. However, the Liverpool dialect does not have this contrast between the two lexical sets. An interesting example of this feature is found in one of the Beatles' songs which rhymes *fair* and *fir*, and *her* and *aware* (Trudgill, 1990: 69). While there is unanimous agreement on the existence of this phenomenon in LE, there is some debate over the precise realisation of the vowel. Wells (1982: 372) states that the most common realisations are [ë:] and [ɛ̈:], while Honeybone and Watson (2006: 8) propose that the most common realisation is [ɛ:], with some instances of [ɜ:]. Honeybone (2007: 127) further suggests that the realisation can be central or front as well. All six sources agree that there may be intra-speaker variation for the actual realisation of the vowel.

However, Honeybone and Watson (2006: 7) assert that LE speakers will lack a contrast for the two lexical sets regardless of the intra-speaker variation.

The final characteristics discussed here which link LE with other northern varieties are the BATH–TRAP non-distinction and the STRUT–FOOT non-distinction. Foulkes and Docherty (2007: 66) claim that the vowels with the strongest sociolinguistic implications in England are the BATH and STRUT vowels. The realisation of the BATH and STRUT vowels create a linguistic division between northern and southern dialects (Foulkes and Docherty, 2007: 66). In this regard, LE patterns with the other North English dialects in that the BATH lexical set does not have a contrast with the TRAP lexical set (Knowles 1973: 287 and Wells 1982: 353). Similarly, LE has no distinction between the FOOT and STRUT words (Knowles 1973: 84) like other northern varieties. According to Watson (2007: 8) both sets are realised with [ʊ]. Knowles (1973) suggests that both of these features are most common in working class speakers.

Let us now turn to the features which distinguish the Liverpool dialect from other neighbouring dialects. Among the most surprising features of LE is its non-rhoticity. "No trace of rhoticity has been reported for any speaker of the variety" (Honeybone, 2007: 125). This is consistent with many other UK dialects, such as RP. However, the major dialect varieties which would have influenced LE in its development were rhotic: the South Lancashire, Irish and Scottish dialects range from variably rhotic to fully rhotic (Honeybone, 2007: 125). For the environments where the rhotic is produced, there appears to be a difference in realisation. In initial position, the /r/ is generally realised as a post-alveolar approximant [ɹ] (Knowles, 1973: 327). As described by Knowles (1973: 327), Wells (1982: 372), Honeybone (2004: 7), and Watson (2007: 3), /r/ is most commonly expressed as a flap [ɾ] in intervocalic position or when preceded by an obstruent in the onset, as noted by Knowles (1982: 372) and Watson (2007: 3).

Secondly LE shows a pattern of TH-stopping, which Honeybone (2007: 123) describes as a process where speakers minimize or sometimes lose their contrast between the alveolar stop and the dental fricative. A speaker of LE may produce the [θ] in *thin* as an alveolar stop [t] or a dental stop [t̪], thereby minimising or neutralising the articulatory contrast between the words *thin* and *tin* (Watson 2007). Honeybone (2004: 5) suggests that this alternation is likely to have entered LE through the influence of Irish dialects. TH-stopping is attested in current varieties of Hiberno-English (Wells 1982, Hickey 1999). However, TH-stopping in LE appears to be lexically conditioned and, therefore, the lexical entry will govern whether TH-stopping will surface. Honeybone (2004: 6) demonstrates this by showing that for the speakers in his paper the [θ] in the words *though* and *theatre* is only ever realized as a fricative; there is no occurrence of the plosive. This is consistent with Knowles' (1973: 324) assertion that he found no evidence of the alternation occurring in a specific environment. If the alternation is not governed by a phonetic

environment, but rather a lexical one, it would only make sense that Knowles was not able to find a predictable phonetic environment. Recent work shows that TH-stopping is robust and occurs even in low-frequency words such as *plinth* and *birth* (Honeybone and Watson 2004).

Honeybone (2007: 18) states that "[o]ne of the clearest phonological characteristics of Modern Liverpool English is the way in which underlying plosives are realised." Specifically, he is referring to the phenomenon in LE whereby underlying stops are lenited. Lenition is very common cross linguistically, partially as a result of the often vague definition provided for lenition allowing for many processes to be classed as a type of lenition. Kirchner (2001: 3) suggests that lenition involves the 'weakening' of a consonant, as do most other definitions of lenition. The proposed strength of a consonant is commonly based on a consonant sonority scale. Mainly, it depends how similar the consonant is to a vowel; the 'stronger' the consonant is the less similar it is to a vowel. Although there are many lenition processes in many languages, LE is particularly fascinating as it is a unique alternation in dialects of English, according to Watson (2007: 3) and Honeybone (2007: 130). Knowles (1973: 324) and Wells (1982: 371) both describe LE lenition as stops with incomplete closures, producing a fricative or an affricate. The precise environments in which this alternation occurs are quite complex. Here are a few examples of the environments where lenition will occur: word-final, intervocalic, coda and certain onset positions (Honeybone, 2001: 230). It should also be noted that plosives will be more likely to be realized as a fricative in some environments and as an affricate in others (Honeybone, 2007: 130).

One final feature of LE distinct from the surrounding dialects is the focus of this dissertation: the phonological pattern of the PRICE vowel. To fully understand this phenomenon it is important to understand the research regarding the PRICE vowel raising patterns. The following section provides a literature review on phonological patterns in the PRICE vowel. Importantly, 'raising' for the purposes of this dissertation describes a phonological process where the PRICE vowel exhibits allophonic variation in specific environments, but does not necessarily denote a raised quality of the nucleus. 'Raising' is defined in this way in order to include PRICE vowel phonological processes which relate to the LE alternation, but do not have a variant with a raised nucleus. Furthermore, as discussed in Section 3.1 some of the findings suggest raised and non-raised variants.

1.3 The Price Vowel

"It is widely recognised that vowels carry the bulk of responsibility for differentiating English accents from one another" (Wells, 1982: 178). In particular, the PRICE vowel has been the subject of many studies due to its interesting phonological effects. Moreton and Thomas (2004: 3)

explain that "the nucleus and offglide of /aɪ/ place conflicting demands on the tongue body, more so than any other English vowel." This is a partial explanation for the variety of realisations of the PRICE vowel found in different dialects of English. For example, GA has [aɪ], East Irish [əɪ] (Hickey, 2007: 144), Dublin Irish [ɑɪ] (Hickey, 2007: 150), and Isle of Man [æɪ] (Hamer, 2007: 173).

Aside from a large amount of variation in the realisation of the PRICE vowel, there are also a number of well-documented phonological phenomena related to it.[2] Joos (1942) is the first one to detail the now well-researched raising pattern in Canadian English, which is often used as one of the characteristics to mark Canadian English off from other North American varieties, mainly American dialects. That being said, there are other North American varieties which also exhibit raising patterns, as shown in Table 1 of the Appendix. 'Canadian Raising', as coined by Chambers (1973) has been heavily researched since then (Picard 1977, Paradis 1980, Thomas 1991). The realisation of the PRICE vowel in Canadian English is governed by the following coda. Chambers (1973) claims that [ʌɪ] appears before a voiceless coda, such as in *ice* [ʌɪs], and [aɪ] elsewhere, as in *eyes* [aɪz], *eye* [aɪ], and *iso* [aɪ.soʊ]. The precise raising pattern was expanded on by Bermúdez-Otero (2004), who posited that the foot structure of the lexical item must also be considered when looking at the behaviour of the PRICE vowel. Namely, the voiceless obstruent must either be in the same foot (*syphon* ['sʌɪfn] vs. *syphonic* [saɪ'fɑnɪk]), or in a weaker foot for raising to occur. To demonstrate this, compare the PRICE vowel variants in *night* [nʌɪt], *nitrate* ['nʌɪˌtɹeɪt], and *citation* [ˌsaɪ'teɪʃn].

Aitken (1981) and McMahon (1991) examine the Scottish Vowel Length Rule which influences most vowels in Scottish English including an alternation of the PRICE vowel. McMahon (2000: 150) claims that the PRICE vowel is part of the Scottish Vowel Length Rule, whereby [ʌɪ] occurs in the short vowel environments and [aːɪ] surfaces in the long environments. In terms of the actual conditioning environments, Harris (1985: 14) states that the SVLR is "to a large extent conditioned by the phonetic environment". Specifically, Aitken (1981) provides a number of environments where the long variant surfaces including word-final stressed syllables, before voiced fricatives and /ê/, and in syllable final position.

Moving further south into the Fen area of England, Britain (1997) records a raising pattern in the English Fenlands which is very similar to Canadian Raising. He observes that central Fenland speakers have two PRICE vowel variants; the central onset variant of the PRICE vowel occurs before voiceless consonants and open onsets are realised elsewhere. Similarly,

[2] A full list of the currently observed phonological patterns with the PRICE vowel is included in the Appendix Table 1 taken from Moreton and Thomas (2004).

Foulkes and Docherty (2007: 68) suggest that younger Fen speakers will produce [əɪ] before a voiceless coda and [aɪ] or [a:] elsewhere.

The Liverpool PRICE vowel phonological pattern is first presented in Knowles' (1973) pioneering PhD dissertation on the Liverpool dialect using speakers from Vauxhall and Aigburth; subsequent researchers (Honeybone and Watson 2006, Watson 2007) have alluded to the existence of an interesting phonological pattern in the PRICE vowel. Knowles (1973) uses the idea of 'focus' in order to describe the phonological pattern occurring in LE. According to Knowles, focus provides an explanation for the existence of a monophthong realisation in certain dialects of English. The 'initial-focus' of certain diphthongs and placement of stress lead to the simplification from wide diphthongs to monophthongs. If a diphthong has initial focus then the nucleus is less likely to exhibit a change in quality than the offglide. Conversely, if the diphthong has 'end-focus' the nucleus is more likely to undergo a change than the offglide. While this investigation is not a systematic study, and Knowles (1973) admits that there is a large amount of variation in the data, it can assist in determining the types of environments and variants to be studied. Specifically, Knowles observes four relevant environments: before voiceless consonants, before voiced consonants, before nasal consonants and in final open syllables. According to Knowles (1973), before voiceless consonants the PRICE vowel is realised as a centralised diphthong (represented as [əɪ] in this dissertation) before voiceless consonants. Before a voiced consonant, except nasals, the nucleus assimilates to the offglide adding length to the nucleus (Knowles 1973: 308). This is represented here as [aˑɪ], where the assimilation to the nucleus is shown by the extra lengthening of the [a]. In open syllables, Knowles (1973: 308) suggests that the nucleus is assimilating to the offglide. However, his specific descriptions leads me to represent this variant as [aɪ], where there is a low mid articulation followed by a high front articulation and both segments have fairly equal weight. Finally, the offglide assimilates completely to the nucleus in the pre-nasal position, so that the offglide is lost altogether. I will represent this allophone as the lengthened monophthong [a:]. As this study is the most comprehensive one we have to date, I have chosen to use these environments and realisations as a starting point for my analysis. This by no means suggests that I have limited the analysis to only these realisations or environments, only that these will be the main focus of this dissertation, unless the evidence necessitates further additions to the realisations or the environments.

Berry's (2009) undergraduate dissertation provides a second study of contemporary LE, although it is perhaps even more vague than Knowles (1973). Berry presents a preliminary investigation of the PRICE and MOUTH phonemes in LE. The study includes seven participants of varying ages from the area of Halewood, who completed two elicitation tasks (Berry, 2009: 9). Each participant was recorded reading a word list and a short passage (Berry, 2009: 10). It is

important to note that Berry chose to include only two allophonic realisations of the PRICE vowel: [aɪ] and [a:]. Although both the PRICE and the MOUTH vowels were analysed, I will only present the results pertaining to the PRICE vowel here. In the analysis, Berry (2009: 25) concludes that the PRICE vowel is realised as [aɪ] 100 per cent of the time preceding a voiceless coda. However, she finds that both [a:] and [aɪ] occur preceding a voiced consonant (ibid. 26), although she notes that [a:] is the usual realisation before a voiced coda. Berry also asserts that [a:] surfaces 100 per cent of the time before a nasal coda (ibid. 27). Although this investigation does not describe the same pattern observed in Knowles (1973), it does give a contemporary account of the PRICE vowel in LE which shows that there is a phonological alternation.

In the following discussion, I have chosen to represent the PRICE vowel in LE using the four variants described above: [əɪ], [aɪ], [aˑɪ], and [a:]. This reflects the observations by Knowles (1973) and to some extent Berry (2009). Both studies allude to the existence of at least three conditioning phonological environments, while Knowles (1973) adds a fourth one. The environments under investigation are: before voiceless consonants, before voiced consonants, before nasal consonants, and in open syllables.

2. Methodology

2.1 Data Collection

This investigation uses a Corpus Phonology approach which stands apart from other approaches in that the speech data being analysed is based on actual productions and not intuitions of the investigator. Some corpus phonologists will create their own corpus; however, for the purposes of this dissertation my corpus is composed of pre-existing speech samples. Corpus Phonology has become increasingly popular, especially with internet resources readily available to linguists. This method of data collection can be advantageous especially if the purpose of a study requires a substantial number of speech samples. In many cases, it is possible to find a considerable amount of samples faster and more efficiently than to record the samples by oneself. The process of devising an appropriate elicitation method, finding participants, making appointments, and recording the samples is often long and arduous. Therefore it is often difficult to accumulate a corpus of comparable size to one composed of pre-existing samples, where the data-collection is significantly faster. However, in some cases Corpus Phonology can put a linguist at a disadvantage, especially when the dialect or language has few sources readily available to the linguist.

Pre-existing samples provide the added benefit of using speech samples from various sources with different objectives. This helps to ensure that the data collection is not biased by the researcher's one views and objectives as the informant, speech style, and phonological environments are completely outside of the control of the researcher. It is extremely unlikely that each of the sources uses the same participants or elicits speech in the same way. Although this will most likely create a greater degree of phonological variability, it also potentially allows the researcher to claim that an investigation can be generalised to a particular speech population as a diverse range of speech styles and informants are analysed.

On the other hand, it is sometimes difficult to find enough tokens of the desired phonological environments in pre-existing samples precisely because the linguist has no control over the data elicitation in the samples. Hume (2001: 2) notes that using a pre-existing corpus for Corpus Phonology can be problematic for researching a particular phenomenon, as there may be too few desired tokens in the speech sample. Collecting samples oneself allows a linguist to decide exactly what information they wish to collect, and possibly study many environments which may otherwise be difficult to find in pre-existing corpora. Moreover, if the researcher is involved in a sociolinguistic study pre-existing samples can provide an added challenge. There is

often limited information on the informants (Hume 2001:2) and therefore the linguist may not have access to crucial information for their study, such as age or social status.

In order to obtain a sizable corpus for this study, I chose to use samples taken from four internet sources – British Broadcasting Corporation (BBC), British Library (BL), and International Dialects of English Archive (IDEA) – as well as one set of samples elicited by an undergraduate student in linguistics for a similar topic on the PRICE and MOUTH vowels in LE (Berry 2009). The British Broadcasting Corporation created the website 'Voices' in order to allow the public to listen to standard and regional dialects of the United Kingdom. There are clips of 1200 informants having conversations about language, culture, and a variety of other subjects (BBC 2011). In a similar vein, the British Library provides a database of over 600 sound clips and 71 recordings within the 'Sounds Familiar?' and 'Sound Archive' websites (BL 2011). These sites were created to "capture and celebrate the diversity of spoken English in the second half of the twentieth century" (BL 2011). While the International Dialects of English Archive is "a free, online archive of primary source dialect and accent recordings" created in 1997 by Paul Meier, a renowned dialect coach, in connection with the theatre department at the University of Kansas (IDEA 2011). This website provides English speech samples for both dialects of English, and English spoken in foreign accents.

I have chosen not to limit the speech samples within my corpus to a specific speech style, even though some phonologists advocate using only conversational-type speech or casual speech. Cole and Hasegawa-Johnson (2010) assert that casual speech exhibits a greater degree of variability not only between speakers, but also within an individual speaker than elicited speech does,[3] and provides a phonologist with data which is phonologically very similar to everyday speech. Furthermore, elicited speech tokens are often 'hyper-articulated', potentially distorting the natural phonological features of the informants' speech and are, therefore, not necessarily representative of natural speech (Cole and Hasegawa-Johnson, 2010). A word produced in connected speech may exhibit different qualities from a word produced in isolation, as described by Cole and Hasegawa-Johnson (2010). The majority of the internet samples in my corpus do not include elicited speech with the exception of the IDEA samples which have a short reading passage preceding the recorded casual speech.

The Laura Berry (LB) samples contain exclusively elicited speech consisting of a word list and a reading passage. It was important to include some samples with elicited speech as a portion of the analysis is concerned with the extent to which conversation and elicited speech differ phonologically. Additionally, elicited speech has advantages over conversational speech.

[3] Elicited speech for the purposes of this dissertation refers to speech samples which consist of a reading passage or word list and therefore cannot be regarded as conversational-style speech.

The researcher has control over the type of environments recorded, informants used, and the number of tokens gathered. While the elicitation task was not designed by me the researcher was investigating a very similar topic, as mentioned above.

Often one of the disadvantages of Corpus Phonology is the lack of information about the informants, as mentioned above. However, most of my samples did contain some metadata, as described in Section 2.2.

2.2 Informant Metadata

The majority of my corpus is supplemented with detailed metadata from the original sources. I have not limited the range of informants on the basis of sex, age, or social status. It was my expressed intention to include any and all available pre-existing samples with a Liverpool dialect in order to provide an unrestricted sampling which will support any generalisations I make with regards to the PRICE raising pattern in Liverpool English. Despite having placed no restrictions on the informants, the resultant corpus is well distributed in both sex and age. Overall there are 35 informants – 18 female and 17 male – ranging in age from 18 – 90 with an average age of 44. When separated into age groups, the samples also represent each age group well; 11 informants between the ages of 15 – 29, 13 between 30 – 59, and 9 informants 60+ years of age. In a real-time study on the /r/ productions in Saks and Macy's in 1962 and 1986, Labov (1994: 91) uses a similar division of age; the only difference is the age group 55 – 70. Based on my corpus and the oldest informant being 90, I chose to make the final age group 60+ as then each age group would be an equal division of 30 years. Hume (2001) created a corpus of 40 informants for her study on phonological variation in conversation, and suggests that this sample size will produce results which are representative of the speech community according to previous work by Chambers (1995) and Fasold (1990).

Similar to gender and age, I did not restrict the location of the informants to those strictly in the city of Liverpool, but also included informants from other areas of the Merseyside which clearly exhibit characteristics of the Liverpool dialect. For any samples which I was unsure that the accent was LE another linguist familiar with the Liverpool dialect was consulted. There are 26 informants from areas within the city of Liverpool, and 9 from other areas of the Merseyside. Table 2 in the Appendix details the metadata available for each of the informants, including sex, age, location, number of years in the area, occupation, and any comments made by either the informant or interviewer. In general, the comments chosen to be included either reflect views of the informant or the interviewer on the informant's dialect or information on the family history which may have an effect on the results of the study. The samples are named according to their

source with the abbreviations as follows: IDEA (ID), Laura Berry (LB), British Library (BL), and British Broadcasting Corporation (BBC).

2.3 Analysis

Most of the sources supplemented the speech samples with an orthographic transcription, which was verified for accuracy. These transcriptions were used to determine the available PRICE vowel tokens in each of the speech samples. Those samples without a provided orthographic transcription were either manually searched for PRICE vowel tokens noted or transcribed orthographically in full. Using PRAAT (Boersma & Weenink 2010) each of the tokens were extracted from the speech file and labelled with the token and informant code for spectral analysis. Wideband spectrograms with a maximum of 5000 Hz were used in the analysis. As all samples were pre-recorded no information on the recording instruments and their settings are available.

In total, 709 PRICE vowel tokens were analysed. The tokens were allocated to categories based on the voicing and manner of articulation of the following consonants within the word. The categories are as follows: before voiceless stops (__vl stop), voiceless fricatives (__vl fric), voiced stops (__vd stop), voiced fricatives (__vd fric), nasal consonants (__nasal), the lateral consonant (__[l]), the rhotic consonant (__[r]), vowels (__vowel), and in an open syllable (open). In order to ensure that this investigation of the PRICE vowel raising pattern in Liverpool English does not unintentionally mask any potential relevant environment, none of the categories were conflated prior to analysis unlike in previous related studies on raising patterns. It is also important to note that although the Liverpool dialect is a non-rhotic dialect, as mentioned in Section 1.2, I chose to retain a category for __[r] rather than merge it with the __vowel environment so as to prevent concealing any differences in the realisation of the PRICE vowel in the two environments by merging the categories. Furthermore, there is a potential in connected speech that the rhotic will be pronounced if the following word is vowel initial.

In terms of proportions of environments, most of the categories are fairly well represented on the whole. The most frequent environment in this study is __ vl stop, which accounts for 201 (28%) of the total 709 tokens. Noticeably, there is an abundance of *like* tokens in the voiceless token category. Specifically, of the total 201 tokens there are 104 (52%) *like* tokens. While listening to the speech samples, it was evident that some of the *like* tokens are undeniably discourse markers. Bright (1992) defines discourse markers "as a set of linguistic items in the cognitive, social, expressive, and textual domains". Furthermore, Bussman (1984) asserts that discourse markers or fillers such as *like* assist in the development of linguistic ability and perform

other important social functions. On the other hand, it seems to be common practice in phonological analyses to exclude the discourse marker *like* under the assumption that it is phonetically different from non-discourse marker instances of *like*, as in Piccinni's (2011) study of Spanish-English code switching, where the discourse marker *like* was removed from prior to the analysis of the diphthongs in *like*. I have chosen to retain all *like* tokens in the final analysis regardless of their functional status for a number of reasons. There is literature suggesting that discourse markers are phonologically reduced (Schiffrin 1987; Brinton 1996). However, those studies which suggest that discourse markers are phonologically reduced make specific reference to *Do you know?* reducing to *Y'know?* (Schiffrin 1987) without suggesting how other similar discourse makers are reduced. Moreover, none of the studies have provided either auditory judgments or spectral analysis which suggest that discourse marker *like* and non-discourse marker *like* are phonologically or phonetically dissimilar. Further to this none of the tokens of *like* appear to differ from other voiceless stop tokens or within the *like* tokens themselves beyond the expected amount of variation in conversation speech samples.

As it is not a common practice to include the discourse marker *like*, it is essential to ensure that the two types of *like* are in fact behaving in a similar fashion. Therefore, at the completion of the spectral analysis (described in detail later in this section) a number of informants' formant measurements of the nucleus and offglide for discourse marker *like* and non-discourse marker *like* were compared through the use of a t-test. The informants were chosen based on the availability of *like* tokens. The results of the t-tests (using the well-accepted standard of $p \leq 0.05$) show that there is no significant difference between non-discourse marker *like* and discourse-marker *like* formant measurements, except for the F2 of the offglide for BL2 which is highlighted in Table 1 below.

Informant	**P-value**			
	Nucleus		**Offglide**	
	F1	**F2**	**F1**	**F2**
ID17	0.8455	0.396389	0.604345	0.288306
ID44	0.774318	0.475211	0.461788	0.107688
BL2	0.545459	0.334188	0.351233	0.008037
BL3	0.644315	0.485408	0.055263	0.980603
BL4	0.832925	0.995780	0.549676	0.874323
BL5	1.0	0.825688	0.333395	0.673534
BL6	0.903560	0.657441	1.0	0.471867

Table 1. Results of the t-test for the formant frequency measurements for the discourse-marker like and non-discourse marker like.

Furthermore, t-tests were performed on formant measurements for discourse marker *like* and non-*like* __vl stop tokens. Again the results show that the vast majority of formant measurements are not significantly different between the discourse marker *like* and __vl stop tokens (see Table 2). Those formant measurements which do show a significant difference are highlighted.

Informant	**P-value**			
	Nucleus		**Offglide**	
	F1	**F2**	**F1**	**F2**
ID17	0.618740	0.898150	0.037122	0.838452
ID18	0.849444	0.643686	0.631805	0.740545
ID44	0.710963	0.588506	0.558240	0.304018
BL2	0.801551	0.381595	0.392387	0.001263
BL3	0.717759	0.351251	0.727618	0.370721
BL4	0.109739	0.833918	0.015980	0.543966
BL5	0.157528	0.552295	0.058183	0.596852
BL6	0.913355	0.974831	0.318735	0.343488

Table 2. Results of the t-test for the formant frequency measurements for the discourse-marker like and __vl stop tokens.

Before nasal consonants is the category with the second most tokens at 118 (17%). Similar to the voiceless stop category, *time* is a very frequent token in the nasal category, accounting for 77 (65%) of all the nasal category tokens. However, unlike discourse marker *like* the token *time* is not controversial to include in phonological analysis. The next most common environment is before voiced stops with 111 (16%) tokens. Within the remaining categories the voiceless and voiced fricatives are both well represented at 10 per cent of all tokens, whereas all other environments have much fewer tokens.

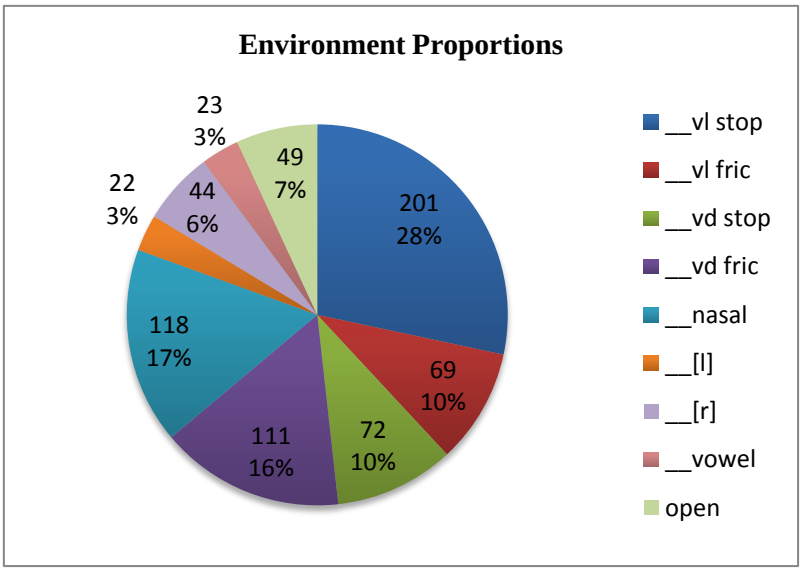

Figure 3. Proportions for each category including number of tokens and percentage of the total 709 tokens.

Syllable and foot structure have been researched in reference to the phonological behaviour of Canadian Raising and have been found to affect the realisation of the PRICE vowel as discussed in Section 1.3 (see Chambers 1973, 1989; Paradis, 1980; Bermúdez-Otero 2003); examples include those of *ìcónoclàst* [aɪ], *cìtátion* [aɪ], and *bìséxual* [aɪ] vs *ìconógraphy* [əɪ], and *cìte* [əɪ] (Chambers 1973, 1989). On the other hand, there is no known syllable or foot-related conditioning in the central Fenland raising pattern (Britain 1997). In fact, Britain (1997) does not include syllable boundaries or stressed/unstressed feet as relevant environment categories, but does include morpheme boundaries in his analysis. He finds that tokens produced with a following morpheme boundary are realised with the same variant as those in a voiced consonant environment (see Section 1.3 for precise details of Fenland raising). Britain and Trudgill (2005) also uses tokens from the SED (Orton & Tilling 1969) for the Fenland area to demonstrate that at the time of the SED collection the characteristics of the Fenland raising pattern were already present. One of the tokens listed exhibiting the PRICE vowel realisation for the voiced consonant category is *Friday*, which does contain a syllable boundary but evidently behaves phonologically like voiced coda consonants. It would be preferable to include syllable/foot structure in this investigation to determine whether the Liverpool Raising pattern is similar in this particular respect to either of the two other raising patterns. However, there are too few tokens with syllable boundaries and virtually no tokens with more than one foot to merit analysing them as separate categories. In addition, the few tokens with a relevant syllable boundary do not observably differ from the non-syllable boundary PRICE vowel tokens. Therefore, syllable and foot structure is not included in the final analysis. It remains to be seen whether syllable and foot structure has an effect on the PRICE vowel phonological patterns in Liverpool English. The lack of appropriate syllable/foot tokens does demonstrate one of the drawbacks of using a corpus approach. As the investigator is not in control of the tokens elicited, it is possible to have too few tokens in one or more of the relevant environments.

The analysis of each token contained both an auditory judgment and basic spectral measurements. Spectral analyses were used in order to substantiate the auditory judgements. There were four possible variants prescribed for the auditory judgements based on the observations from previous studies on Liverpool English. As mentioned in Section 1.3, Knowles (1973) determined four relevant environments – before voiceless consonants, voiced consonants, nasals, and in open syllables – with the following possible realisations: [əɪ], [aɪ], [aˑɪ], and [a:]. Once auditory judgments were made spectral measurements were taken to verify them. In the few cases where there was a disparity between the auditory judgment and the spectral analysis, the auditory judgment was adjusted to reflect the results of the spectral analysis.

The spectral analysis consisted of two F1 and F2 formant measurements and a measurement of the total duration of the vowel for each of the 709 PRICE vowel tokens. All of the spectral measurements were taken by hand with the help of PRAAT. Wherever possible the formant tracks created by PRAAT were used for formant measurements. In a few instances, the PRAAT formant tracks were obscured or obviously distorted, potentially due to poor sound quality. If this occurred the formants measurements were taken at the centre point or darkest area of the visible formant structures.

When determining the appropriate position in the diphthongs to take the two F1/F2 formant measurements, the potential effects of both the preceding and following consonant transitions on the vowel formant trajectories were considered (see Delattre et al. 1962; Lindblom and Studdert-Kennedy 1967; Kewley-Port 1982; Moreton 2004). Depending on the voicing, manner of articulation, and place of articulation of the consonant the formant transitions can differ immensely. Thomas (2000) and Moreton (2004) make specific reference to the formant transitions for the PRICE vowel depending on the voicing of the following consonant. The findings suggest that in the transition area the F1 is lower and F2 is higher in the pre-[t] environment than pre-[d]. As one of the possible variants has a raised nucleus, it was necessary to measure the nucleus at a position in the vowel that is clearly not affected by the preceding consonant. Wright and Nichols (2009) suggest that the measurement for the nucleus of a diphthong be taken at approximately 20 per cent of the way through the vowel in order to avoid transitional formant measurements. With regards to the offglide, Wright and Nichols (2009) recommend formant measurements at approximately 80 per cent through the vowel. The study on formant transitions by Lehiste and Peterson (1961) provides detailed measurements for the transitions between each consonant and the PRICE vowel. These guidelines were considered in order to ensure the accuracy of the formant measurements for the nucleus and the offglide of each of the tokens. Specifically, the first F1/F2 formant measurements were taken at the stable state or near the beginning of the nucleus at a clearly non-transitional point. Likewise, the second pair of F1/F2 measurements were taken at a steady state near the end of the PRICE vowel but not at the transitional area. See Figure 4 for an example of where the two formant measurements, as well as the temporal measurement were taken.

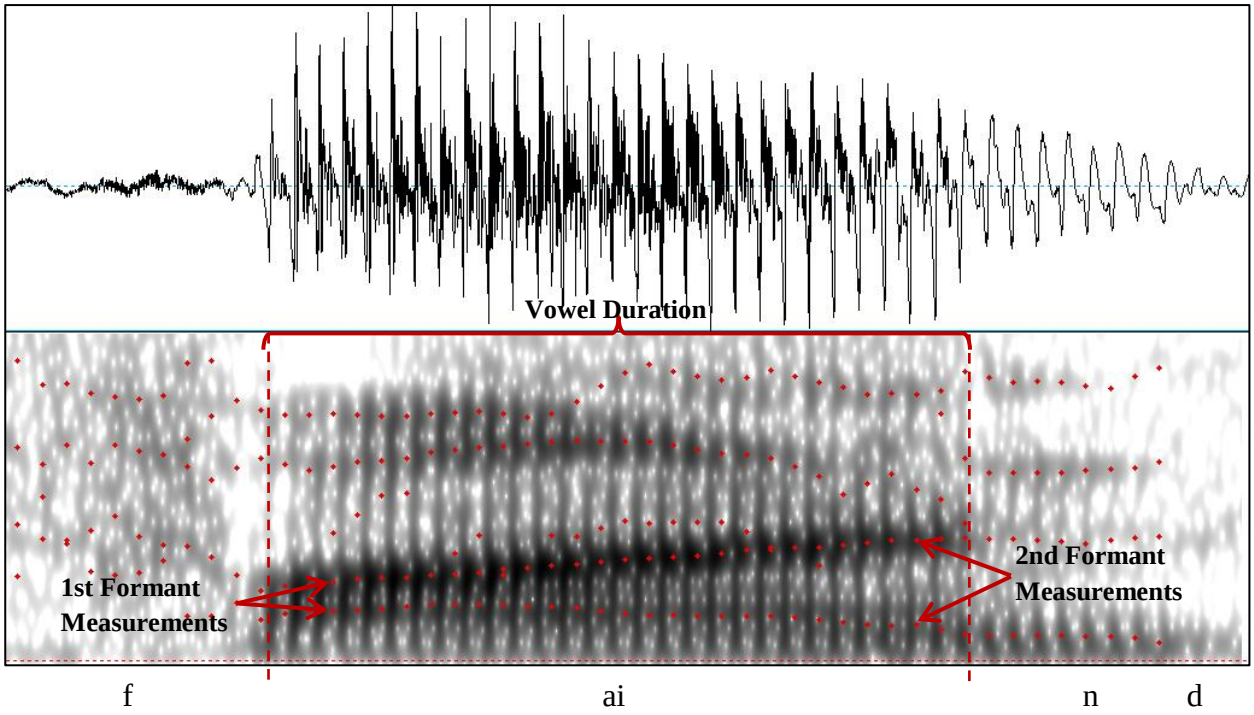

Figure 4. Example for the location of F1/F2 and duration measurements for spectral analysis in PRAAT (Boersma and Weenink 2010; the target word is 'find').

The vowel duration measurements were somewhat more straightforward than the formant measurements. Measurements were taken where clear formant structure began and ended for the vowel. Prior to finalising the duration measurement each of the proposed boundaries were checked through auditory assessment. For tokens which had a preceding or following environment with formant structure, such as nasals, the duration measurement was taken when there was a clear change in the formant trajectory.

None of the spectral measurements have been normalised as the main purpose of this investigation is to determine the phonological patterns in the PRICE vowel in Liverpool English and not to provide a comprehensive spectral analysis. Therefore, it is important to note that the formant frequencies are only comparable within a single informant and not between speakers. There are a few tokens which have been temporally normalised for the purposes of demonstrating formant trajectories. All tokens which have been normalised for duration will be specified when presented. Duration was normalised using a similar (albeit less complex) method to that in Harrington et al. (2005). Formant contours were extracted for the full diphthong using PRAAT and then the time was scale to 2.0s for each token. This ensures that the formant trajectories are able to be compared between different environments.

One of the basic observations of sociolinguistics and the topic of numerous works is the claim that elicited speech in the form of word lists and reading passages differs phonologically from conversational speech, as mentioned in Section 2.1 (Labov 1963, Nakatani et al. 1995,

Schafer et al. 2005, Cole and Hasegawa-Johnson 2010). Elicited speech often has a slower speech rate than conversational speech as a result of the carefully articulated tokens. Speech rate has been shown to have an effect on the phonological realisations of vowels in numerous languages including English (Gay 1968; Pitermann 2000), Dutch (Van Son and Pols 1992), Japanese (Hirata and Tsukada 2004) and Korean (Magen and Blumstein 1993). Gay (1968) in particular studied speech rate effects on diphthongs. In light of these observations, I chose to analyse the elicited speech data separately from the conversational speech. Furthermore, word lists and reading passages for the Laura Berry samples were analysed separately, as word lists would produce the most hyper-articulated speech.

3. Results

The findings of this investigation demonstrate that while Knowles (1973) and subsequent linguistic working in LE are correct in the observation that the PRICE vowel Liverpool English shows an interesting behavioural pattern, the exact phonological facts are more complicated than previously observed. Instead of one phonological pattern, this study finds five phonological patterns used by the informants in this corpus. However, of the five phonological patterns there are two patterns which emerge as the most frequent among these informants.

There are a few complications which are necessary to discuss prior to describing the phonological patterns in detail. As previously mentioned in Section 2.1, using pre-existing corpus samples will at times cause some analytical issues. One of the obstacles related to using a corpus is that the researcher does not have control over the proportion of tokens for each informant in the relevant environments. This has proven to be an issue in this investigation with regard to some of the relevant environments. More specifically, it is not possible to make robust generalisations about some of the original environment categories – __[l], __[r], __vowel, and in open syllables – as there were generally only one or two tokens per informant. Some speech samples did not have any instances of these environments. Therefore, while all 709 tokens were analysed, only the results pertaining to voiceless obstruents, voiced obstruents and nasals will be reported in this dissertation.

Secondly, there is a certain amount of variability in the phonetic realisation of the diphthong for each informant, which is expected as many of the samples have conversation style speech. Hume (2001) and Cole and Hasegawa-Johnson (2010) discuss the greater phonological variation in conversation style corpora. With this in mind, it was necessary to establish a standard on classifying the informants into different phonological patterns. It was ultimately decided that the most practical system was to use the most frequently realised variant for each of the conditioning environments as the basis of categorisation. As a result of the size of the speech samples, there are a number of informants who did not have enough tokens of one or more of the environments to be categorised as having one of the five phonological patterns. In this case the informants' data are available, but will not be presented here. In total 21 of the original 35 informants are able to be classified into the different phonological patterns. However, it must be noted that the results appear to have 25 informants as a result of four informants who have a different phonological patterns in the word list than the reading passage. This is discussed in more detail in Section 4.1.

In this analysis it is found that the obstruents – stops and fricatives – do not produce different realisations based on their manner of articulation, but they do based on their voicing.

Furthermore, Honeybone (2001) describes a process of lenition in stops that is a recognisable feature of the Liverpool dialect (see Section 1.2 for a detailed description of lenition in Liverpool English). During the analysis it was evident that many of the underlying stops were being lenited, and were phonetically fricatives or affricates. Although the stops and fricatives were analysed as separate categories originally, they are presented as a single category in this dissertation. Therefore, the PRICE vowel phonetic realisations and phonological patterns are based on the following conditioning environments: before voiceless obstruents (__vl obs.), voiced obstruents (__vd obs.), and nasals (__nasal).

3.1 Phonological Patterns

The most frequent phonological pattern is characterised by a raised nucleus [əɪ] before a voiceless obstruent, lengthened nucleus [a˚ɪ] before a voiced obstruent, and a lengthened monophthong [a:] before nasals. This pattern greatly resembles the results reported by Knowles (1973) with participants producing variable raising before voiceless obstruents. Nine of the total 35 informants exhibit this phonological pattern. Figure 5 demonstrates this type of phonological pattern using a clear example of the formant trajectories for each of the three environments. The formant contours have been temporally normalised, as have all of the formant contours used to demonstrate the phonological pattern presented in this section.

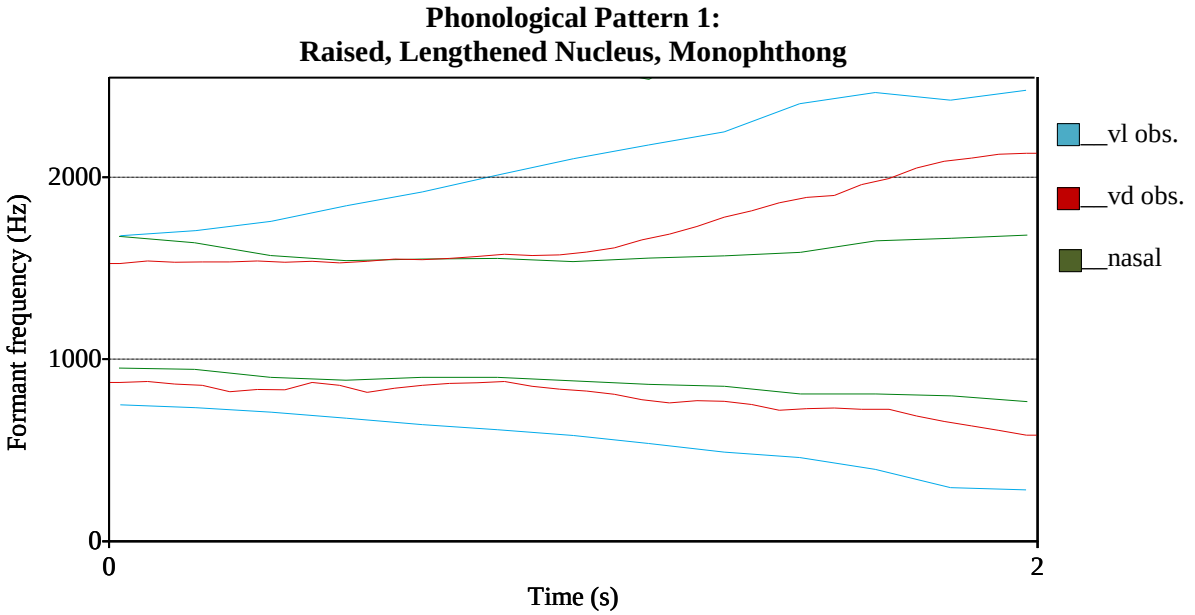

Figure 5. Formant trajectories for Phonological Pattern 1 consisting of a raised nucleus before voiceless obstruents, lengthened nucleus before voiced obstruents, and monophthong in pre-nasal position.

The formant contours presented in Figure 5 clearly show the difference in the realisations for each of the conditioning environments. In the voiceless obstruent environment, represented by the blue line, the F1 of the nucleus clearly has a lower frequency and the F2 has a higher frequency than either of the other two tokens indicating that the nucleus is both raised and fronted in relation to the other tokens. It is also evident in Figure 5 that the nucleus of the PRICE vowel in the voiced obstruent environment is lengthened in comparison to the voiceless obstruent environment. The formant contour of the voiceless obstruent token shows a steady gradual decline of the F1 frequency and rise of the F2 frequency, which give the auditory impression of a short nucleus. On the other hand, the formant trajectories of the voiced obstruent token (red line) indicate an exceptionally long stable state in the nucleus ending more than half way through the formant contour followed by an offglide, again shown by the F1 frequency decrease and the increase in the F2 frequency. Finally, the green line representing the nasal environment is a monophthong as shown by constant F1 and F2 frequencies lacking an obvious movement into an offglide.

The second most common phonological pattern is very similar to the first, the only difference being the realisation of the PRICE vowel in the voiceless obstruent environment. In this pattern, the nucleus of the diphthong is not raised before voiceless obstruents. In terms of the other two environments, the informants were consistent with the previously described pattern retaining the lengthened nucleus before voiced obstruents and monophthong in the pre-nasal environments. There are eight informants producing this phonological pattern. In Figure 6 the formant contours for each of the environments are shown for the non-raising phonological pattern.

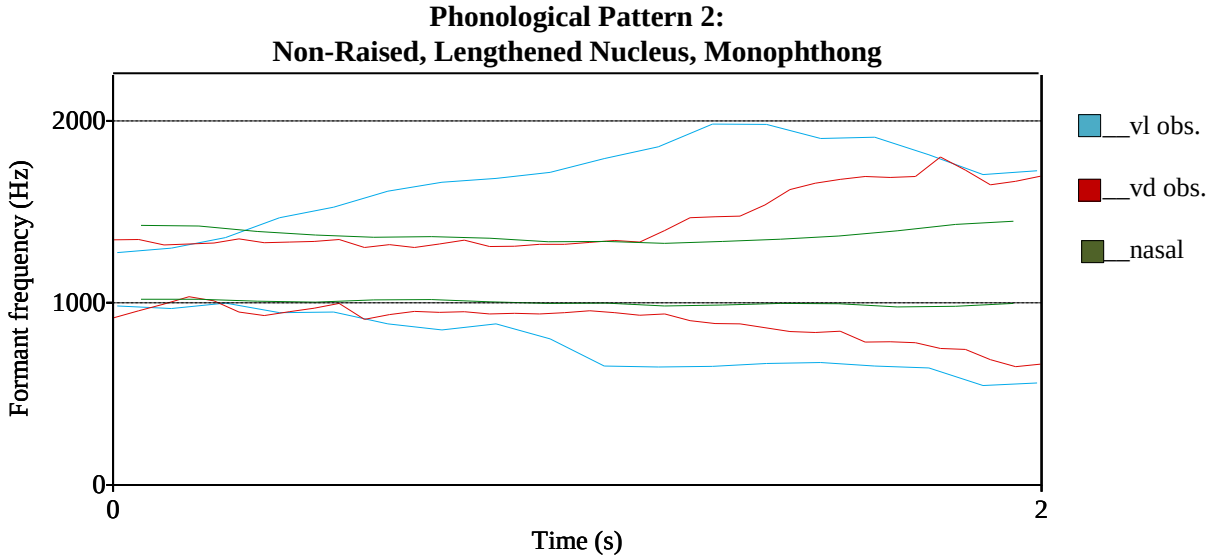

Figure 6. Formant trajectories for Phonological Pattern 2 consisting of a non-raised nucleus in pre-voiceless obstruent environment, lengthened nucleus before voiced obstruents, and monophthong before nasals.

The phonological pattern in Figure 6 is noticeably different from the raising phonological pattern demonstrated in Figure 5. In particular the nucleus F1/F2 frequencies of the diphthong before voiceless obstruents are very similar to the F1/F2 frequencies for the voiced obstruent and nasal environment. While the nucleus of the diphthong in the voiceless environment appears to be slightly longer than that of the same diphthong in Figure 5 it is still clear that there is a lengthened nucleus in the voiced obstruent environment. Note the difference in the start of the offglide before voiceless obstruents and voiced obstruents. The nasal environment is again clearly monophthongal with little variation in the F1/F2 frequencies throughout the vowel.

Remaining are the three least frequent phonological patterns, two of which were exhibited by three informants. Phonological Pattern 3 has a raised variant in the pre-voiceless condition and monophthongs in both the voiced and nasal environments, as shown in Figure 7. Conversely, Phonological Pattern 4 has a non-raised variant in the pre-voiceless environment and monophthongs both before voiced obstruents and nasals, as demonstrated in Figure 8.

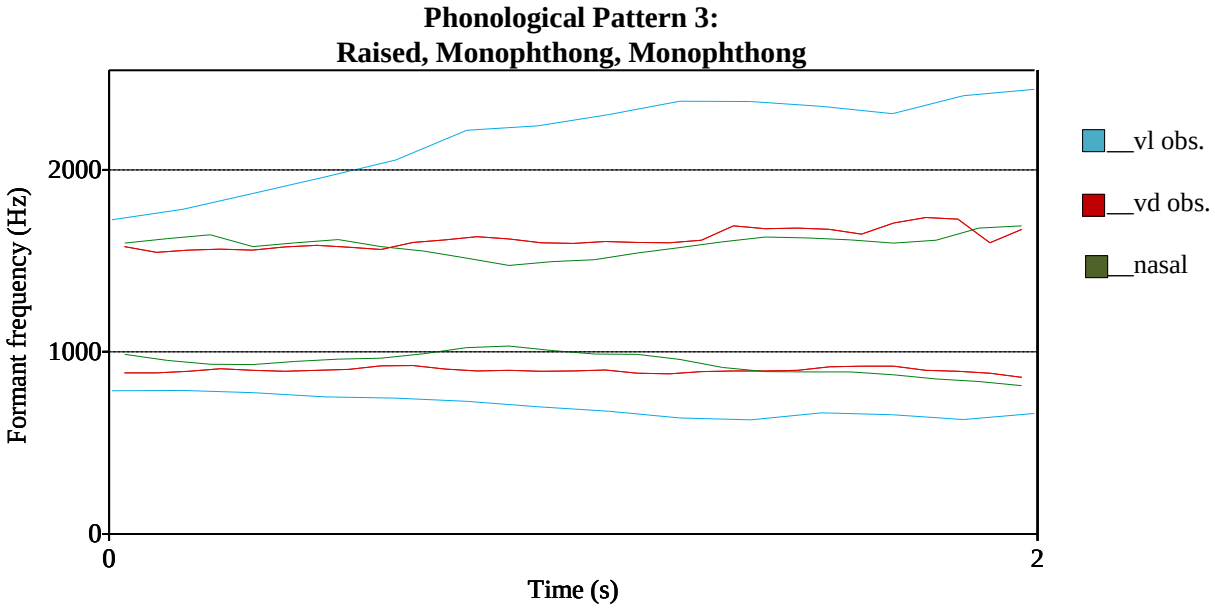

Figure 7. Formant trajectories for Phonological Pattern 3 consisting of a raised nucleus before voiceless obstruents, and monophthongs in the voiced obstruent and nasal environments.

As with Figure 5, it is evident that the nucleus of the voiceless obstruent token is raised and fronted, as shown by the lower frequency of the F1 and the higher frequency of the F2 compared to the other two tokens. The second interesting observation is that the formant contours for the voiced obstruent and the nasal environments are extremely similar, indicating monophthongal realisations of the PRICE vowel. Again notice that both of the formant contours have very little variation in the F1/F2 frequencies, and the lack of any visible offglide.

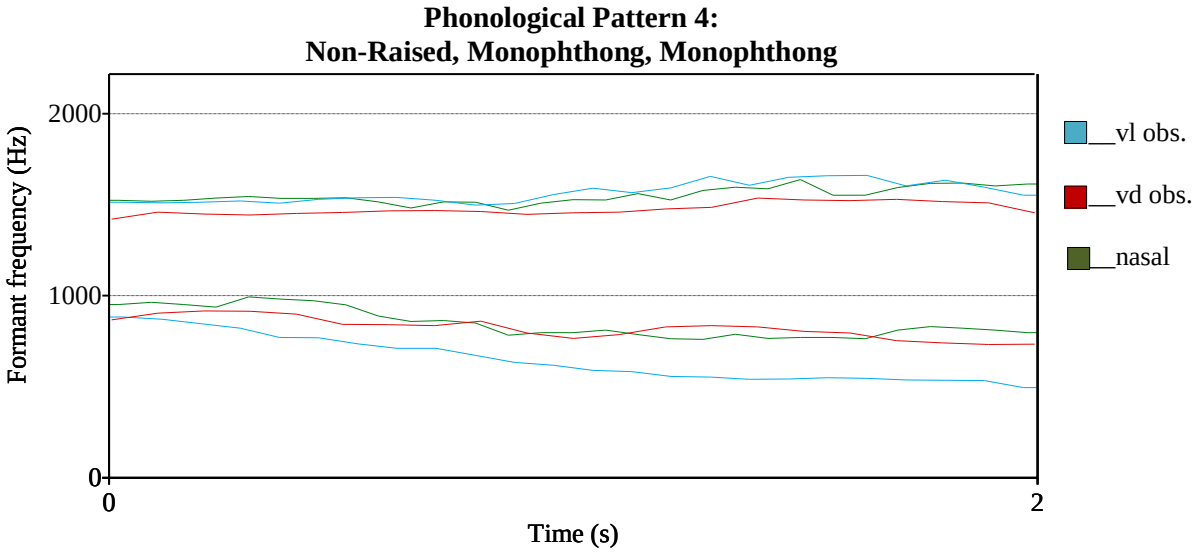

Figure 8. Formant trajectories for Phonological Pattern 4 consisting of a non-raised nucleus pre-voiceless obstruents, and monophthongs before voiced obstruents and nasals.

It is clear in Figure 8 that the F1/F2 frequencies in the nucleus preceding voiceless obstruents are virtually the same as the F1/F2 frequencies in the voiced obstruent and the nasal categories, similar to the formant contour in Figure 6. Much the same as in Figure 7, the voiced obstruent and nasal environments clearly show a monophthong. It is interesting to note that the formant contour in the voiceless category appears to have an offglide which becomes much higher in terms of vowel height, as shown by a decrease in the frequency of the F1, but varies very little in terms of vowel backness. Even considering this, it is clear both in the auditory and spectral analysis that the voiceless obstruent environment produces a non-raised diphthong. For these particular tokens the offglide F2 measurements are: 1645Hz for the voiceless token, 1517Hz for the voiced obstruent token, and 1572 for the nasal token. These frequency measurements show that the offglide the voiceless token is different in terms of F2 frequency. Further to this the nucleus F2 measurement for the voiceless token is 1517Hz again showing that there has been a change in the F2 frequency.

Interestingly, the least frequent phonological pattern observed in this investigation is the pattern which is most similar to what is often described as ‘reference’ varieties, such as RP. This specific phonological pattern has no raised variant and no monophthongal realisations. There is a lengthened nucleus in both the voiced obstruent and nasal environments, with non-lengthened [aɪ] before voiceless obstruents, which is generally thought to be the standard realisation of the PRICE vowel. Figure 9 demonstrates formant contours for the three environments for this phonological pattern. Only one informant exhibited this phonological pattern consistently in both elicited and conversational speech. It should be noted that this informant moved to Manchester at 22 years of age and has moved to other English cities since then. At the time of the interview she

was living in South London. Therefore, it is possible that her PRICE vowel has adjusted to the other varieties. One further informant produced this pattern in the word list section of their speech sample. The informant produced a different phonological pattern in the reading passage portion of the speech sample, as discussed in Section 4.2. In fact, the pattern produced in the reading passage was the most common phonological pattern containing both a raised nucleus variant and a monophthongal realisation of the PRICE vowel.

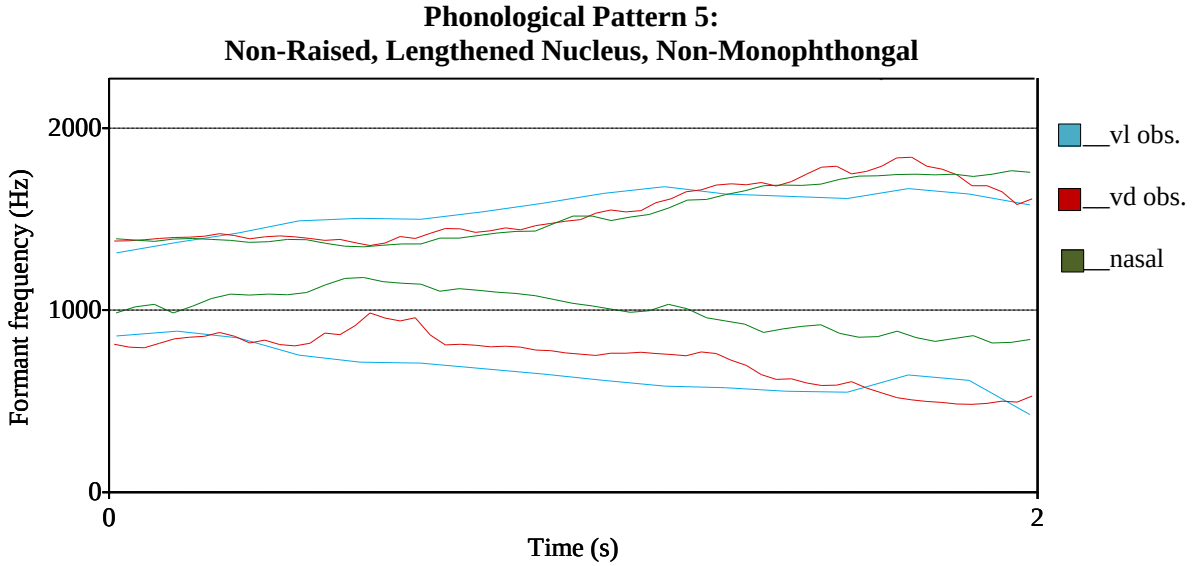

Figure 9. Formant trajectories for Phonological Pattern 5 consisting of [aɪ] in the pre-voiceless obstruent environment, and a lengthened nucleus before voiced obstruents and nasals.

Figure 9 indicates the non-raised variant in the voiceless and voiced environments, as the F1frequency measurement for the nucleus are both similar. This particular token for the nasal environment has a higher F1 frequency at the nucleus than the voiceless and voiced environments, which indicates that the nucleus of this diphthong is phonetically lower than that of the other two tokens. It is clear that the voiceless obstruent nucleus is much shorter than both the voiced and nasal environments, indicating that the voiced and nasal environments have a lengthened nucleus.

	__vl obs.	**__vd obs.**	**__nasal**	**# of Informants**
Phono. Patt. 1	raised	lengthened nucleus	monophthong	9
Phono. Patt. 2	non-raised	lengthened nucleus	monophthong	8
Phono. Patt. 3	raised	monophthong	monophthong	3
Phono. Patt. 4	non-raised	monophthong	monophthong	3
Phono. Patt. 5	non-raised	lengthened nucleus	lengthened nucleus	2

Table 3. Summary of the PRICE vowel phonological patterns and number of informants for LE.

When examining the types of phonological patterns that are possible in Liverpool English, there is one feature which stands out from the rest. There are no phonological patterns which include a raised variant in the pre-voiceless environment but do not include a monophthong in the nasal condition. Similarly, there are no phonological patterns having a monophthong in the voiced obstruent environment and a non-monophthongal realisation in the nasal environment. This means that if an informant has either a raised variant in the voiceless environment or a monophthongal variant before voiced obstruents, the informant will necessarily have a monophthongal variant in the nasal environment.

3.2 Substantiating Variants

Some of the findings for the five phonological patterns require further substantiation. One of the results presented in the previous section is that the voiced obstruent environment has either a diphthong with a lengthened nucleus or a monophthong. It was important to ensure that this result was not due to an error in auditory and visual spectral judgement. It is well-documented that vowel durations are longer before a voiced consonant than before a voiceless consonant (House and Fairbanks 1953; Peterson and Lehiste 1960; Van Summers 1987; Moreton 2004). This being the case it was essential to use statistical analysis to verify that those tokens transcribed as a lengthened nucleus variant were not being incorrectly identified as such due to the extended length of the diphthong in the voiced obstruent environment. Although all of the tokens were visually analysed for nucleus and offglide length, I also performed some statistical analyses on a small set of tokens in order to ensure the validity of the transcriptions. Three measurements of duration were taken for these specific tokens: the total duration, the nucleus duration and offglide duration. Measurements for the nucleus and offglide duration were taken in accordance with the standards set out in Section 2.3. The beginning of the offglide is defined as the point at which there is a decline in the F1 frequency and an increase in the F2 frequency (see Figure 10 for an example of the duration measurements). These measurements were then converted into percentages of the total length of the diphthong. For the set of tokens used in this statistical test the average nucleus length for tokens transcribed as a lengthened nucleus variant is 64 per cent of the total diphthong, while the average nucleus length for tokens transcribed as [aɪ] or [əɪ] is 36 per cent of the total duration of the diphthong. Wright and Nichols (2009) suggest that the formant movement from nucleus to offglide begins approximately 30 per cent to 40 per cent into the diphthong. This is consistent with the results found for the non-lengthened nucleus diphthongs. Furthermore, the difference in the length of the nucleus in the two different environments is highly statistically significant according to a t-test ($p<0.001$).

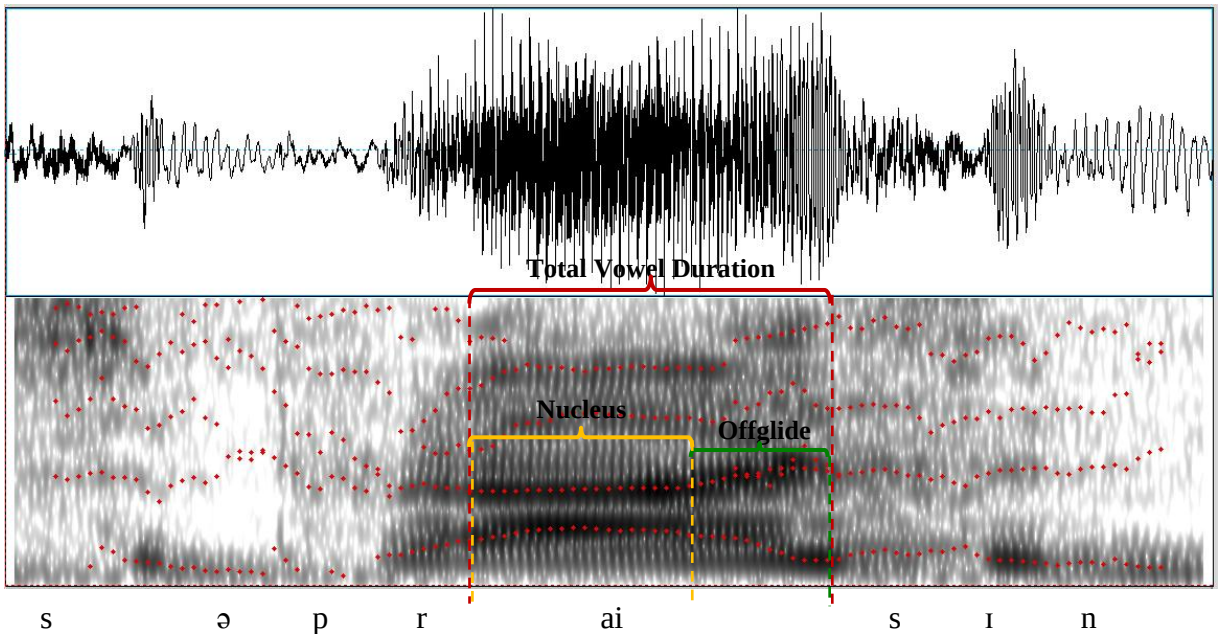

Figure 10. Example for the location of the three duration measurements taken for statistical analysis in PRAAT (Boersma &Weenink 2010; the target word is 'surprising').

During the spectral analysis, it was sometimes difficult to determine whether the auditory judgement of a raised variant was accurate as the difference in the F1 frequencies for the raised and non-raised variants was sometimes minimal. The formant measurements for the nucleus were statistically analysed, in order to substantiate the claim that the PRICE vowel in LE has a phonetically raised variant. A t-test was used to verify that the difference in the F1 frequencies for the voiceless and voiced environments were statistically significant for a number of the informants both with the raising and non-raising patterns, again using the well-accepted standard of $p \leq 0.05$. Table 4 lists the results of the t-tests for the informants used.

Pattern	Informant	P-value	Significant
Raising	ID16	0.002187	yes
Raising	ID17	0.00008	yes
Raising	LB11	0.003906	yes
Raising	LB8RP	0.000493	yes
Raising	LB14RP	0.001908	yes
Non-raising	LB8WL	0.719109	no
Non-raising	LB14WL	0.196509	no
Non-raising	LB12	0.902869	no
Non-raising	BL6	0.072915	no

Table 4. Informants tested for statistical significance in the difference of the F1 frequency measurements in the voiceless and voiced environments.

Table 4 demonstrates that the informants judged as having a raising phonological pattern do have lower F1 frequency measurements in the voiceless obstruent environment, which are significantly different from the F1 frequency measurements before voiced obstruents. In other

words the nucleus in the voiceless environment is higher than it is in the voiced environment. Likewise, the same informants' F2 frequencies were tested with a t-test between the raised and non-raised variants. In this case, however, there was no statistically significant difference found for the F2 frequencies. This indicates that there is no significant change in the vowel backness although the pre-voiceless variants are raised.

3.3 Social Factors

As discussed in Section 2.2, the informants are well distributed with regards to gender, age, and location. Section 3.1 presents the final results of the phonological patterns for 21 of the 35 informants. However there appears to be a total of 25 represented as four informants produce different phonological patterns in the word list and reading passage, which is further discussed in Section 4.1. There were 14 female and 7 male informants included in the final sample. While the sample became somewhat uneven with regards to gender after the removal of informants with insufficient data, the age ranges remained fairly well proportioned. The 18 - 29 age range has 7 informants, the 30 – 59 age range has 9, and the 60 – 90 age range has 4. Of the 21 informants included in the classification 17 come from an area of Liverpool and four from Merseyside.

Previous studies have found correlations with regard to gender and phonological change. Labov (1994: 156) states that "in most of the vowel shifts that we looked at, women are considerably more advanced than men". Moreover, while he suggests that women use non-standard forms much less than men in a linguistically stable system (Labov 1990), women are the innovators in linguistically unstable systems or linguistic systems undergoing change. In a study on the glottal stop distribution in Tyneside, Milroy *et al.* (1994) find that female informants are leading the change in the realisation of the glottal stop in Tyneside. Moreover, Watt and Milroy (1999) suggest that young females are the forerunners of a change occurring in the NURSE vowel in Newcastle. The results of the present investigation also show that two of the phonological patterns are used exclusively by female informants. Specifically, only female informants produce the phonological patterns 3 and 4, which have monophthongal variants in both the voiced and nasal environments (see Figure 11 for the full distribution of the phonological patterns based on the informants' gender). In Figures 11-13 the phonological patterns are represented by the names given to them in Section 3.1. For instance, Phon. Pattern 1 is the pattern with a raised pre-voiceless variant, a lengthened nucleus variant in the voiced environment, and a monophthong in pre-nasal position.

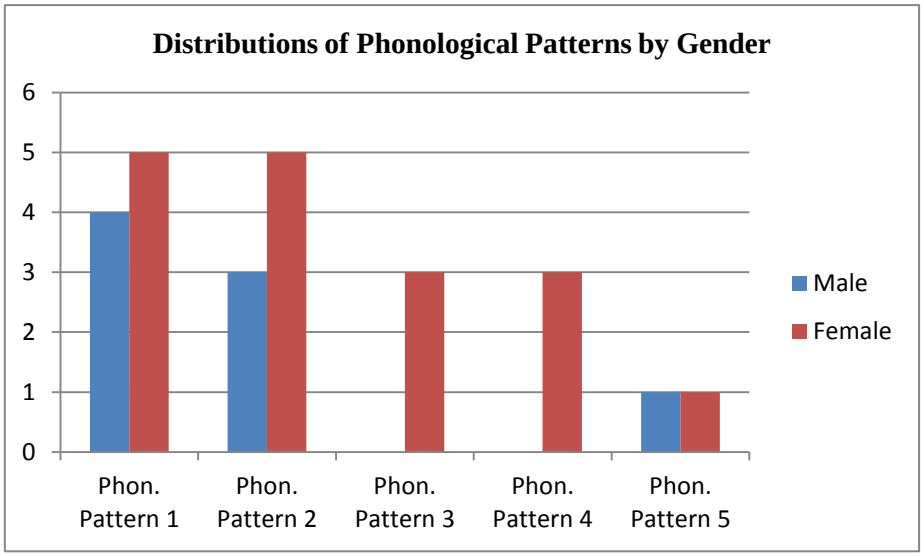

Figure 11. Distribution of PRICE vowel phonological patterns in LE based on informants' gender.

The age of an informant has also been found to correlate with phonological patterns and language change in previous studies. In one area of dialectology, traditional dialectology, researchers seek the most 'traditional' forms of the language. Therefore, Orton (1962), like many traditional dialectologists, used NORMs or nonmobile, older, rural males (Chambers and Trudgill 1998: 29). Specifically, Orton described that "[t]he kind of dialect chosen for the study was that normally spoken by elderly speakers of sixty years of age or over" where "the traditional types of vernacular English are best preserved to-day" (Orton 1962: 14). This would potentially suggest that the mobile, younger, urban females present the best representation of innovative speech. Hockett (1950) and Labov (1994) discuss the correlation of age with language change. In particular, Labov (1994) suggests that less advanced allophones of a phonological pattern tend to appear in older speakers, while more advanced ones are found in younger ones.

The present study finds that the two phonological patterns favoured by females described above are also correlated with age, as shown in Figure 12. That is to say, phonological pattern 3 with a raised variant before voiceless obstruents is produced by informants under the age of 24. Similarly, phonological pattern 4 with the non-raised variant in the voiceless environment is used by informants aged 47 or younger. Furthermore, Figure 12 demonstrates that informants over the age of 30 favour phonological pattern 2 (non-raised pre-voiceless, lengthened nucleus before voiced obstruents and a monophthong in pre-nasal position). The average age is 52 for the informants who produce phonological pattern 2, compared to 38 for phonological pattern 1. Only one informant under the age of 30 uses phonological pattern 2. The two informants who use phonological pattern 5 are 41 and 60 years of age.

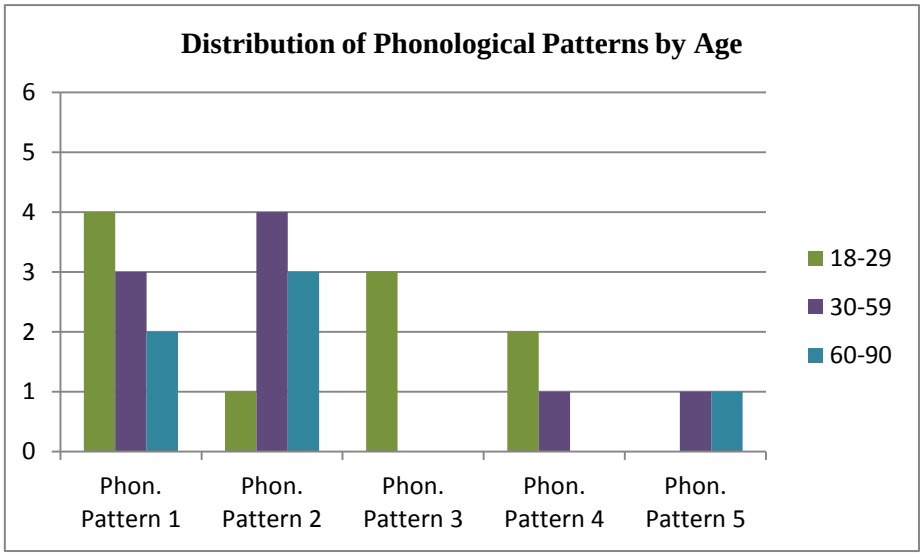

Figure 12. Distribution of PRICE vowel phonological patterns in Liverpool English based on age of the informant.

The distribution of phonological patterns is also correlated with location of informant. While the informants from Liverpool exhibit all of the phonological patterns, the informants from other areas of Merseyside seem to produce the phonological patterns with monophthongal variants, but without a raised variant. Figure 13 illustrates the distribution of phonological patterns based on the location of informant.

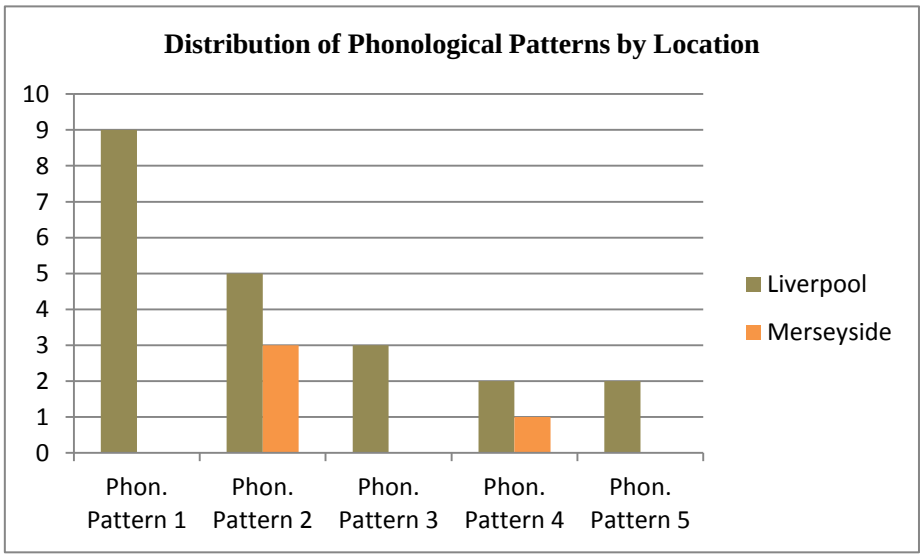

Figure 13. Distribution of PRICE vowel phonological patterns in LE based on informants' location.

Noticeably the Merseyside informants do not have the raised variant in voiceless environments. However, they do seem to always have a monophthongal variant in the pre-nasal environment and possibly preceding voiced obstruents. However, the sample size for Merseyside

informants is relatively small and, therefore, the results pertaining to location need further verification.

This investigation has found that there are five productive phonological patterns with the PRICE vowel in Liverpool English, some of which are correlated with gender, age, and location. The following section presents a discussion of a real-time study with the LB samples, the elicitation speech samples and natural speech, and a comparison of LE with raising patterns in other varieties of English.

4. Discussion

4.1 Real-Time Study

It is possible to perform a small real-time study on some of the speech samples in this investigation. The LB samples are taken from Halewood, which is one of the localities surveyed in the Survey of English Dialectology (SED); (Orton and Halliday 1962). Labov (1994) describes in detail how real-time studies help to determine how a linguistic change has progressed in a given population. One of the possible methods is to find a previous study, return to the population in question and analyse a new representative sample of the population (Labov 1994). This method is termed a trend longitudinal study.

The SED is a large scale dialect survey in England that took place in 1954 and 1955. One of the main goals of this study was to record the most traditional dialects of England. Halewood was the closest locality to Liverpool to be surveyed. The SED surveyed three participants from Halewood with an average age of 74. This speech data represents the period between 1893 – 1910 based on Labov's (1994) assertion that a speaker's accent reaches a fairly stable state after adolescence (Cardoso 2011). Honeybone (2007) suggests that the Liverpool dialect developed approximately in the mid-nineteenth century (see Section 1.1 for a more detailed account of LE dialect formation). Therefore, the SED data represents a period in the history of LE formation which comes shortly after its formation. It should be noted that Halewood is on the periphery of modern-day Liverpool. There are seven LB samples from2009; five informants are between the ages of 19-25 and two are over the age of 50. Informants from the LB samples produce all five phonological patterns. Comparing the SED and LB samples will determine if the PRICE vowel phonological patterns that are seen in modern-day Halewood were present at the time of the SED collection.

In regard to the SED data, there are 68 PRICE vowel tokens divided into the same categories as those described in Section 2.3 (Cardoso 2011). Halewood had an almost exclusively diphthongal PRICE vowel system at the time of the SED collection (see Figure 14 for the distribution of diphthongs and monophthongs in Halewood at the time of the SED collection taken from Cardoso 2011).

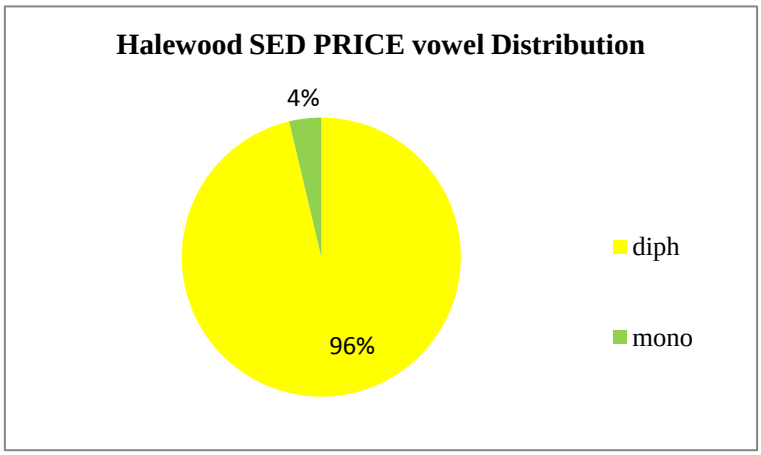

Figure 14: Distribution of diphthongs and monophthongs in Halewood in the SED (Cardoso 2011).

Figure 14 clearly demonstrates the preference for diphthongs as a realisation of the PRICE vowel. Cardoso (2011) reports that while there are two monophthongal tokens of the word *five*, other tokens in a similar environment, such as *hive*, *ivy*, and *shive* have a diphthongal variant. Therefore, it may be possible to assess those two tokens of *five* as exceptional.

In terms of the precise phonetic realisations of the PRICE vowel there seems to be a significant amount of variation (see Figure 15 for the phonetic realisations of the PRICE vowel in Halewood in the SED taken from Cardoso (2011). Yet if the nucleus of the diphthong is examined there are really only two variants, [aɪ] and [ɑɪ], which have varying degrees of nasalisation. Specifically, the difference is in the backness of the nucleus: the [aɪ] is articulated further forward than [ɑɪ].

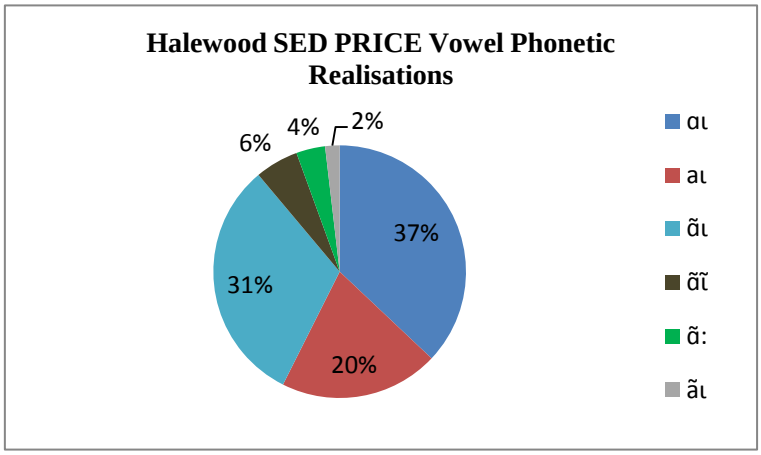

Figure 15: Distribution of phonetic realisations in Halewood in the SED (Cardoso 2011).

Comparing Figure 14 and 15 to the data from the LB samples taken about 50 years later yields some noteworthy results. Figure 16 illustrates the evident shift from an almost fully

diphthongal phonological system to a partially monophthongal system with a change from 4 per cent monophthongal realisations to 25 per cent.

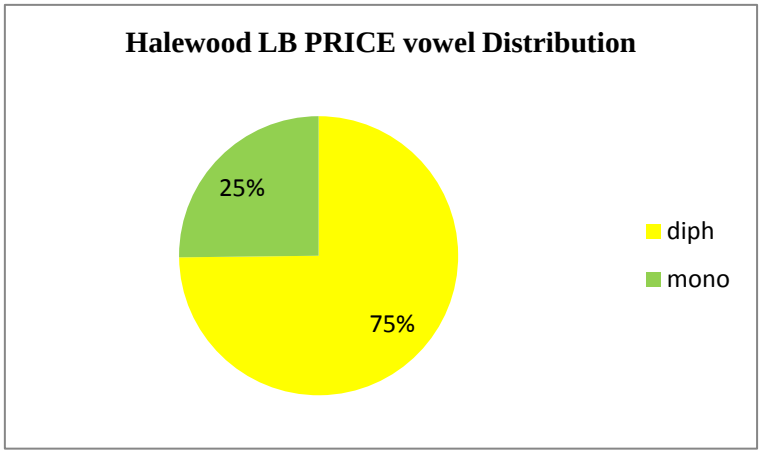

Figure 16: Distribution of diphthongs and monophthongs in Halewood from the LB samples.

Returning to the phonetic variants found in Halewood at the time of the SED, there is another observable difference between the realisations in the SED and those in the LB samples. Although Figure 15 appears to show a great deal of phonetic variation none of the variants have a raised nucleus. On the other hand, the LB samples show that there is now a raised nucleus variant in the dialect (see Figure 17).

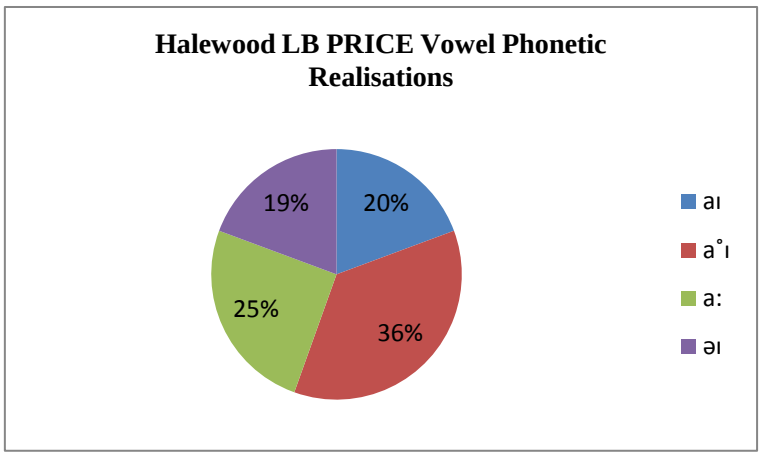

Figure 17: Distribution of phonetic realisations in Halewood from the LB samples.

This small real-time study as well as the Merseyside data detailed in the results clearly demonstrate that even in the last 50 years some of the characteristics of the Liverpool dialect have been spreading. It is clear that the informants from Halewood in the LB study have adopted a raised nucleus variant and a monophthongal variant which were not present in the SED. These findings as well as the observation that there are a number of different phonological patterns at

play in LE may suggest that there is a phonological change in progress involving the PRICE vowel. This possibility is discussed in more detail in Section 4.3.

4.2 Elicitation vs. Conversation

It has often been asserted that elicitation speech samples in the form of a word list or reading passage do not emulate the informants' phonologically natural speech. This investigation purposely used speech samples of both elicitation and conversation style speech in order to assess this well-established idea. The results suggest that there are certain elicitation tasks which produce different phonological patterns from conversation style speech, while other elicitation tasks do not change the phonological features of natural speech. In order to demonstrate this, I will turn to the ID and LB samples. As mentioned previously, the LB speech samples consist of a word list and a reading passage, whereas the ID samples include a reading passage and a conversation.

Cole and Hasegawa-Johnson (2010) assert that elicited speech from reading either forms in isolation, such as a word list, or in context, such as a reading passage, produces much less variability than casual or conversational speech. Therefore, elicitation data is not phonologically representative of natural speech (Cole and Hasegawa-Johnson 2010). The results of the present study support this claim to an extent, but further suggest that although there is less phonological variation in elicited speech only the word list speech samples produced PRICE vowel phonological patterns different from those of the reading passage and conversation data. All of the ID informants exhibited the same phonological pattern in both the reading passage and conversation data. While it is possible to see a slight increase in variation from the reading passage to the conversation data, it is not a considerable difference. Figure 18 demonstrates an example of the distribution of phonetic variants in ID44 in the reading passage and conversation data.

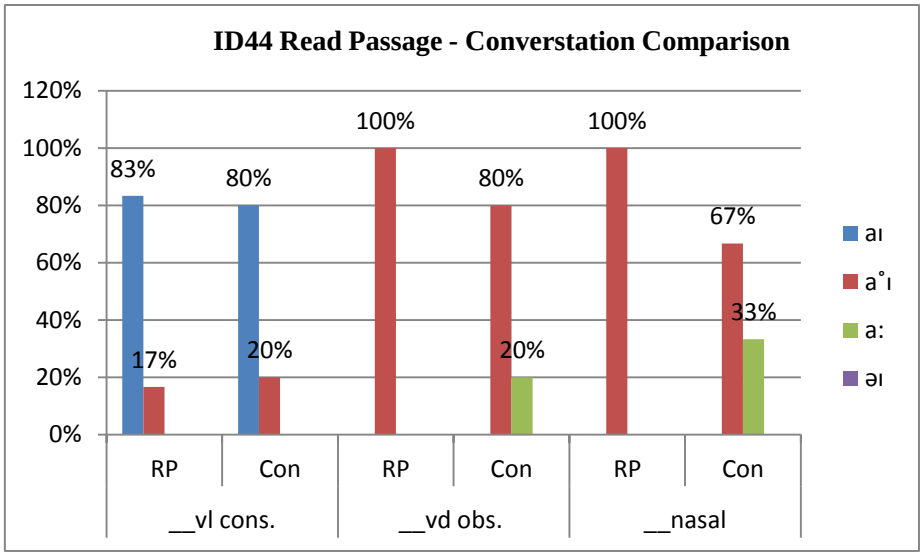

Figure 18: ID44 distribution of phonetic variants in the reading passage and conversation data.

It is undeniable that there is more phonetic variation in the conversation data than the reading passage data, particularly in voiced obstruent and pre-nasal environments. However, it is also possible to see that the dominant phonetic variant remains the same in both the reading passage and the conversation data. Thus, the phonological pattern did not change depending on the speech style.

On the other hand, the difference in phonetic variation from the word list to the reading passage in the LB samples creates a change in phonological pattern. The most striking example of this is LB8 (see Figure 19), where the dominant variants change in two of the three conditioning environments.

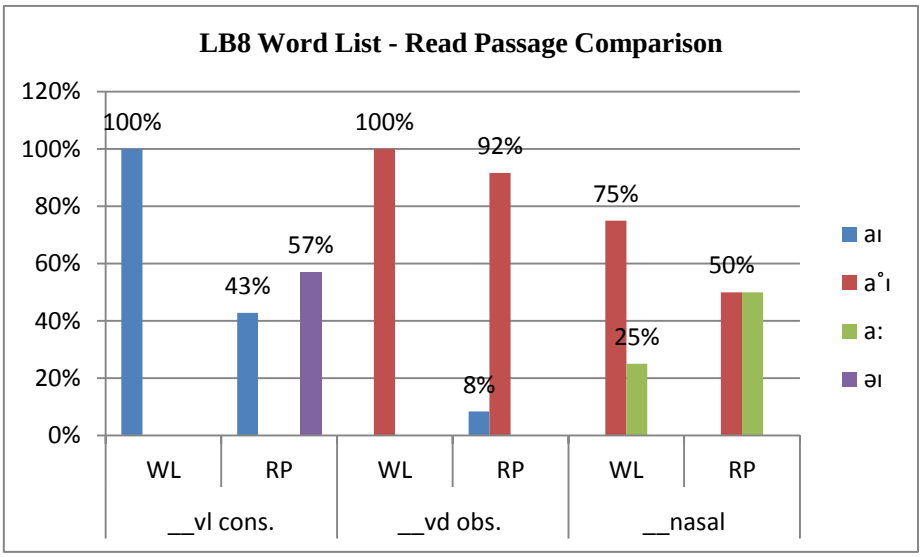

Figure 19: LB8 distribution of phonetic variants in the word list and reading passage data.

In the word list portion of the speech sample, informant LB8 predominantly uses phonological pattern 5 with no raised variants, a lengthened nucleus, and no monophthongal variants. Importantly, this is the phonological pattern most similar to the RP pattern. However, in the reading passage, the informant shifts from having 100 per cent non-raised variants to 43 per cent, and 57 per cent of the pre-voiceless tokens are raised. Likewise, in the pre-nasal environment the informant shows only 25 per cent monophthongal realisations, which increases to 50 per cent in the reading passage. Thus, the informant changes from using phonological pattern 5 to phonological pattern 1, the most frequent pattern found in this investigation. Furthermore, the F1 measurements for the nuclei of the pre-voiceless realisations are statistically significantly different with p=0.02082 using a t-test. Again applying a t-test to the F1 frequency values the nucleus of all tokens in the voiceless, voiced obstruent, and nasal environments in the word list and reading passage, the F1 values are also found to be significantly different from the word list to the reading passage at p= 0.005532.

Out of the seven LB samples four of the informants shift phonological patterns from the word list portion of the interview to the reading passage. LB10 and LB11 exhibit phonological pattern 1 in the word list and phonological pattern 3 in the reading passage (see Figure 20 and 21).

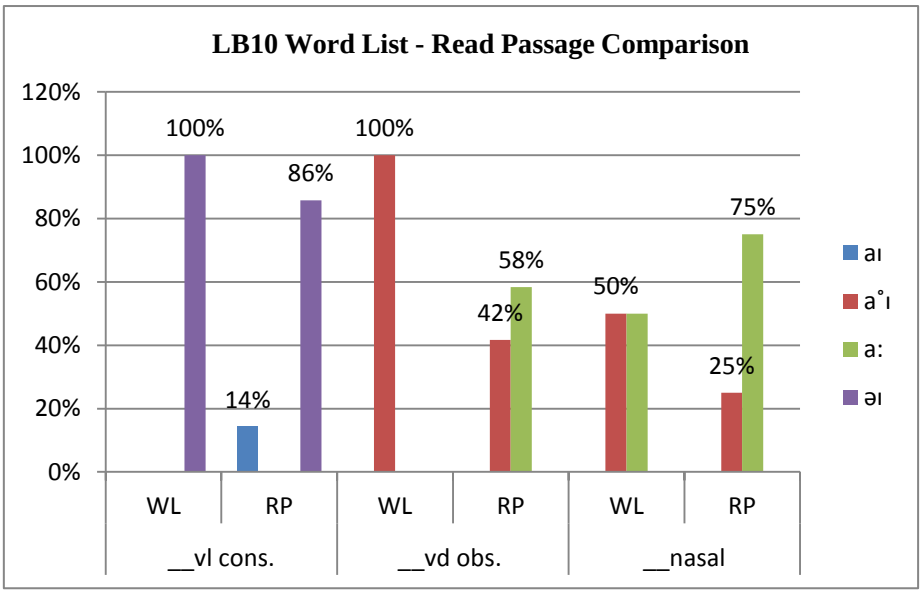

Figure 20: LB10 distribution of phonetic variants in the word list and reading passage data.

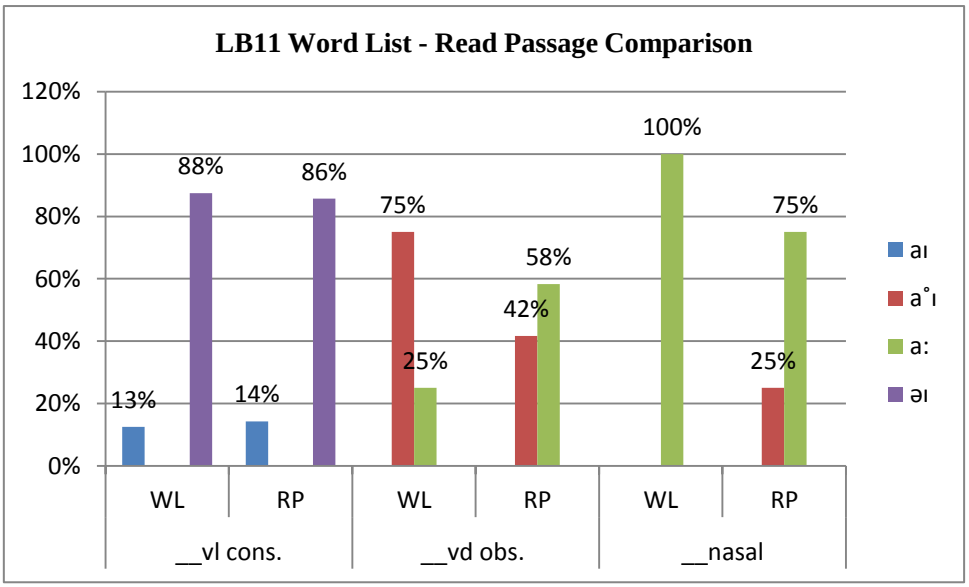

Figure 21: LB11 distribution of phonetic variants in the word list and reading passage data.

LB10 demonstrates very well the shift from using a lengthened nucleus diphthong in the pre-voiced obstruent environment to a monophthong. In the word list section the lengthened nucleus variant is realised 100 per cent of the time, while in the reading passage this decreases to 42 per cent increasing the monophthongal realisations from 0 to 58 per cent. The change in LB11 is not as drastic with the lengthened nucleus productions dropping from 75 per cent in the word list to 42 per cent in the reading passage. Noticeably, there is less of a difference between the word list and reading passage in the realisations in the pre-voiceless and nasal environments.

Finally, LB14 predominately uses the phonological pattern 4 in the word list with a non-raised variant before voiceless obstruents and a monophthong in the other two environments and phonological pattern 3 in the reading passage with a raised variant and monophthongal realisation in the voiced and nasal environments (see Figure 22).

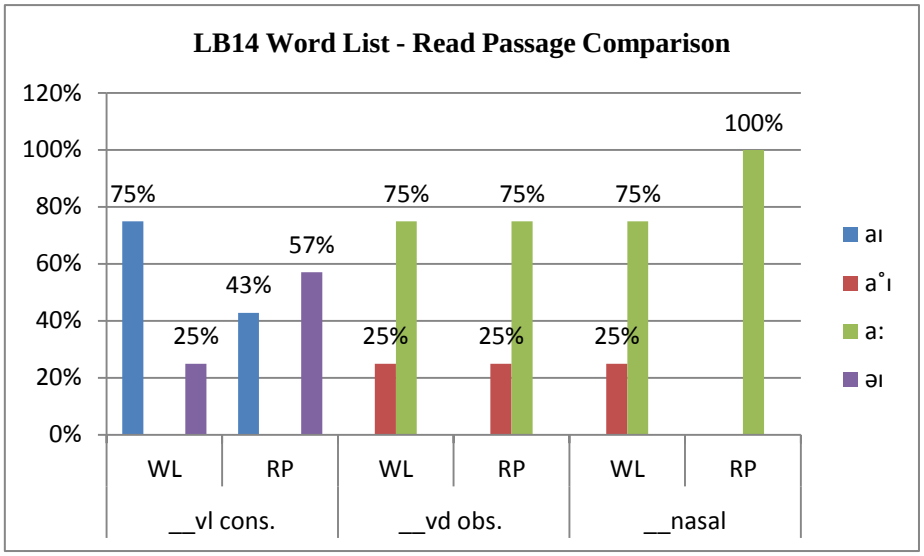

Figure 22: LB14 distribution of phonetic variants in the word list and reading passage data

It is clearly illustrated in Figure 22 that the raised realisation has become the dominant variant in the reading passage where it is only realised in 25 per cent of all tokens in the word list. The other two environments vary only to a small degree between the word list and reading passage. As with LB8 the difference in the F1 frequency measurements for the nucleus of the –pre-voiceless tokens between the word list and reading passage is found to be statistically significant (p= 0.016581).

The findings of this study support the assertion by Cole & Hasegawa-Johnson (2010) that elicited speech provides much less phonetic variation than conversational speech. More than half of the informants with word lists produced a different phonological pattern in the word list tokens than the reading passage tokens. Furthermore, it is clear that the phonological pattern used in the word list is always more similar to a reference variety PRICE vowel pattern than the reading passage. That is to say that the word list phonological patterns use less marked variants than the reading passages. Markedness refers to the idea that there are certain variants which are somehow more simplistic and occur in more linguistic systems, and other variants that are more complex and occur less often in linguistic systems. In this way the PRICE vowel least marked variant would be [aɪ], which is often set as the reference variant for the PRICE vowel. Conversely, the monophthong and raised variants would be more marked, as they occur less frequently in linguistic systems. Specifically, with regards to LB8 the word list phonological pattern is the pattern most similar to a reference variety with no raised or monophthongal variants. While the reading passage phonological pattern contains two marked variants: the raised nucleus and monophthongal realisations. This leads to the assumption that speech produced in word lists are less natural than reading passage as the word list variants are less marked and more similar to

reference varieties. It may also suggest that speakers of LE have some unconscious knowledge that the PRICE vowel in LE is different from that of reference varieties.

It is unclear that all read speech data produces less natural speech than conversational speech, as claimed by Cole & Hasegawa-Johnson (2010). None of the informants with both a reading passage and conversation data produce a different phonological pattern depending on the type of speech. In fact, there is a comparable amount of phonetic variation in both the reading passage and the conversation data; albeit slightly more in the conversation portion of the speech samples (see Figure 18).

4.3 Raising Patterns

One of the main aims of this dissertation is to determine the phonological patterns in the PRICE vowel in Liverpool English and determine how those patterns relate to PRICE vowel raising patterns in other varieties of English. The most obvious difference between the LE results and other varieties discussed in Section 1.3 is that there is not just one phonological pattern occurring in the Liverpool dialect. There are a few possible explanations for the existent of five phonological patterns as opposed to one.

A possible suggestion for finding five phonological patterns is that instead of a specific phonological pattern, there are a number of different variants available for each of the conditioning environments. The speakers of the Liverpool dialect are able to use these variants in different combinations. In that way there would appear to be a number of different phonological patterns, where in reality there are just a set few variants combine in different ways. There is a major issue with this explanation, which help to exclude it. Of all of the phonological patterns found, there are couple of combinations of variants which appear not to be possible. Mainly, there is no phonological pattern which consists of a raised realisation in the pre-voiceless environment without a monophthongal variant before nasal consonants. Likewise the voiced obstruent environment will only have a monophthongal realisation if the pre-nasal variant is also a monophthong. There would be no motivation for these restrictions in a system that did not have phonological patterns. Theoretically, in a system which was based on selecting variants independently of each other, you should be able to find every combination of those variants possible.

A second possible and somewhat more likely explanation is that the five phonological patterns are an indication that the raising pattern in LE is currently going through a phonological change and therefore it is possible to see the older patterns and the newer phonological patterns. The results pertaining to sociological factors support this explanation. As mentioned in Section

3.3, younger females tend to be the most influential in terms of linguistic change. It was found that younger females favour the phonological patterns 3 and 4, both of which have monophthongs in the voiced obstruent and nasal environments. Likewise the phonological patterns with raised variants in pre-voiceless position seem to be used by younger informants than the non-raised phonological patterns. These results suggest that the PRICE vowel in LE may be shifting to a phonological pattern with a raised variant before voiceless obstruents, and monophthongs in the pre-voiced obstruent and pre-nasal environments.

In regards to the actual phonetic variants and conditioning environments in the phonological patterns in Liverpool English, there are some definite similarities with the PRICE vowel raising patterns in other varieties of English discussed in Section 1.3. One of the most striking similarities is the raised variant, which occurs in all three of the raising patterns discussed previously: Canadian raising, SVLR, and Central Fenland raising. Furthermore, Canadian raising and Central Fenland raising have the raised variant in the voiceless consonant environment similar to LE. It has been documented that raised variants are very likely to be in a voiceless consonant environment as this is the most natural environment for a raised variant (Moreton and Thomas 2004) discussed in further detail in Chapter 5. Raised nucleus diphthongs have less of an articulatory distance from the nucleus to the offglide than a non-raised diphthong. It is, therefore, logical that the shorter diphthong is produced in the voiceless consonant environment, as it is well-documented that the duration of a pre-voiceless vowel is shorter than a pre-voiced one.

PRICE vowel variants in the Liverpool dialect before voiced obstruents and nasal consonants are also found in other raising phenomenon in English dialects. Mainly the lengthened nucleus variant [a:ɪ] is reported for the long environments in SVLR (McMahon 2000). The monophthongal variant is also found in Central Fenland raising. Britain (1997) finds that informants produce raised variants in the pre-voiceless environment and [aɪ] or monophthongal realisations elsewhere. While Britain does survey the PRICE vowel before nasals as part of the elsewhere category, the specific results in relation to the nasal environment are not presented. Likewise phonological raising patterns are described for parts of the United States. One of these patterns in particular is similar to both the central Fenland raising and the Liverpool dialect variants found in this investigation. Kurath & McDavid (1961) describe a pattern in Eastern Virginia with a raised variant in the voiceless consonant environment and a monophthong pre-voiced. While there does seem to be many similarities to the PRICE vowel raising patterns found in other varieties of English and LE, there do not seem to be any varieties with the exact phonological patterns found in LE.

5. Origins of Raising Patterns

As there are many varieties with PRICE vowel raising patterns in English both in the UK and Americas, there have been attempts to explain the origins of this phenomenon in English, especially with reference to Canadian Raising. In this section, I present three of the competing theories to explain raising patterns in the PRICE vowel and evaluate their effectiveness in explaining the finding of this investigation on the Liverpool dialect phonological patterns. Each of these theories uses a different approach to explain the origin of raising patterns, specifically historical linguistics, dialectology, and phonology.

Gregg (1973) describes Canadian Raising as a 'Failure-to Lower' as opposed to the common belief that the PRICE vowel has been raised in quality in pre-voiceless environments. Analysing Canadian Raising from a historical linguistic perspective, Gregg suggests that raising is a product of the Great Vowel Shift (GVS). He relies on the hypothesis that the phonological changes in the GVS did not occur simultaneously, but rather, that it progressed by spreading from one phonological environment to another. This is a common theory for many phonological changes. Furthermore, Scottish and Irish varieties retaining a [əɪ] or [ʌɪ] variant provides apparent evidence of the GVS earlier stages (Gregg 1973). According to Gregg, Elizabethan and Jacobean planters from England introduced the Anglo-Irish dialect around 1600.

Specifically in the case of Canadian Raising, the pre-voiceless environment maintains a variant from an earlier stage of the GVS with a shorter more centralised realisation. He explains that this is a result of the pre-voiceless environment creating a pressure for raised variants due to the shorter vowel duration. The articulatory distance between the nucleus and offglide is shorter than the diphthong in the completion stage of the GVS. This articulatory pressure is great enough to impede the variant from entering the final stage of the GVS. Inversely, the pre-voiced environment completes the final stage of the GVS with the PRICE vowel variant having a longer articulatory distance between the nucleus and the glide. Pre-voiced variants are able to reach the final stage of the GVS as there is no phonological pressure to prevent it. Gregg further explains that although Canadian Raising is an innovation from Canadian English, the presence of Scottish English speakers and the SVLR in the colonisation of Canada helped to reinforce this phonological pattern. Advocates of the 'Failure-to-Lower' theory suggest that the pre-voiced environment has a more diphthongal variant than the voiceless environment, according to Moreton and Thomas (2004).

It is clear that this theory is unable to account for the results found for LE as the most frequently realised variant in the nasal environment is a monophthong. House and Fairbanks (1953) discuss the difference in vowel duration according to the voicing, manner of articulation,

and place of articulation. The pre-nasal environment is reported to have a slightly shorter duration (0.232 seconds) than before voiced obstruents (0.261 seconds), but a vastly different duration from the pre-voiceless environment (0.174 seconds). In this way, the nasal environment would behave in a similar manner to the voiced obstruents, and include a diphthong with a more diphthongal variant than the pre-voiceless variant. This does not happen in the Liverpool dialect; instead we see a monophthongal variant occurring in the nasal environments. Furthermore, if the voiceless environment creates a pressure for the least diphthongal variant then it is most likely that the monophthong will surface in the voiceless consonant environment. However, this is not the case. There is no raising pattern currently reported which has a monophthong in the voiceless environment and a different variant in other environments.

Another issue facing this theory in regards to the Liverpool dialect PRICE vowel is the suggestion that regional variants with a raised realisation have not yet reached the completion stage of the GVS. If this is the case and the Liverpool raising pattern is the product of the GVS, as is claimed for Canadian Raising, then we should be expected to see evidence of these raised variants after the completion of the GVS and the formation of the Liverpool dialect. There have been many studies regarding when the GVS reached completion. Although it is difficult to pin down the exact time period as some vowel changes are thought have completed after others. Wolfe (1972) discusses that many present day vowel realisation would have been completed by the sixteenth century. However, in the case of *clean*, which would have rhymed with *lane* and now rhymes with *lean*, the change must have completed by the middle of the eighteenth century. For the purposes of this discussion, I will assume the latest possible date suggested for the completion of the GVS, by the eighteen hundreds (Algeo and Pyles 2010), while noting that some historical linguists suggest this time to be earlier (Zachrisson 1913, Wyld 1927, Wolfe 1972).

Section 1.1 establishes the possible timelines set out for the development of LE. The first suggestion by Knowles (1973) puts the formation of the Liverpool dialect between 1830 and 1889 after the suggested time for the completion on the GVS. Honeybone (2004, 2007) further expands on Knowles original theory and proposes that emergence of the Liverpool dialect occurred within the nineteenth century. Recently, Cardoso (2011) used the SED to determine the PRICE vowel variants occurring at a time near the end or slightly following LE dialect formation. The five localities closest to Liverpool were surveyed, including Halewood, as discussed in Section 4.1. The SED speech data is representative of the period between 1893 – 1910, (Cardoso 2011), as determined by using the principles from Labov (1994) regarding the age that language becomes stable and the metadata provided by the SED. If the PRICE vowel raising patterns are as Gregg (1973) describes a consequence of the GVS. Then the variant in Liverpool at the time of the SED should contain some variants from a previous stage of the GVS, especially in the

voiceless consonant environment. However, the results show that that raised variant in LE was not present at the time of the SED.

It should be noted that the only pre-final stage GVS PRICE vowel variants found in the five localities in the SED are not found in the results of this study. These are [i:] and [ɛɪ], as demonstrated by Orton et al. (1978) in the Linguistic Atlas of England, which are clearly a product of a previous stage of the GVS. According to Cardoso (2011), these two variant are only found in a rather restricted environment. The first environment is in the ME **ī2**, which Labov (1994) describes as a separate category of ME **ī** words, as they have been known to behave differently from other ME **ī** words in some dialects. These words are described as "ME short **ĭ** followed by a velar consonant and /t/ [as] in *right, night, fight,* [… T]he velar was first realized as a voiceless palatal and then disappeared, with compensatory lengthening" (Labov 1994: 495). Evidence from the Oxford English dictionary (OED) demonstrates that some of the northern varieties of English have not completely lost the velar consonant or diphthongised the vowel. Some of the examples of this are *sight* with the variant 18 north *seet* and *night* with the variant Eng. North 17 *neeght* (Cardoso 2011).

The [i:] and [ɛɪ] realisations are also found in the ME **ī3** lexical items (Cardoso 2011)**.** Labov (1994) again recognises the ME **ī3** words as a subcategory of ME **ī**. Specifically, ME **ī3** words are described as lexical items historically with a long ē followed by a 'g' or related lexical items, such as *die* and *thigh*. Again the OED provides northern dialect forms which demonstrate the [i:] and [ɛɪ] variants, for example *eyes* with the variant ME north *een.*

Though it is interesting to note that these pre-final GVS PRICE vowel variants rarely occurred in Halewood, the locality closest to present-day Liverpool in the SED and are not reported in the results of this study even though tokens from both the ME **ī2** and ME **ī3** categories are analysed. Furthermore, part of Gregg's (1973) argument for the development of ME **ī** is that "no undiphthongized ME **ī**'s remain anywhere" (Gregg 1973: 137), which is clearly not the case. In summary, although there are some pre-final GVS PRICE vowel variants found in the SED in the localities surrounding Liverpool, it is clear that these variants are not the same as the raised variant found in the phonological patterns described in Section 3.1. Therefore, Gregg's (1973) 'Failure-to Lower' theory is clearly ill-equipped to describe all of the findings for the LE PRICE vowel phonological patterns. I turn now to the second theory evaluated in this dissertation, 'reallocation' presented by Trudgill (1986), in order to partially explain the origins of raising patterns.

Trudgill (1986) presents a dialectological explanation for the development of Canadian Raising through the theory of 'reallocation' as a part of the New-dialect formation process. In order to fully understand the process of reallocation, it is important to understand the process of

new-dialect formation described by Trudgill (1986). The New-dialect formation theory involves a number of different stages, which take place over a number of different generations. Trudgill proposes that new-dialect formation is often the result of dialect contact, whereby there was a larger immigration of people from different mutually intelligible dialectal backgrounds, much like the situations that occurred in Canada, New Zealand or Liverpool. It is not simply enough to have dialect contact; there must also be dialect mixture. If the different dialect groups never mix then there is no need for linguistic accommodation and consequently, no new dialect is created. Linguistic accommodation, as proposed by Giles (1973), is the hypothesis that speakers of different dialects attempt to adapt to each other by adjusting their robust dialectal features in a way that aids communication. Trudgill (2004) uses New Zealand English as a prime example of dialect contact, mixture, and linguistic accommodation. He states "New Zealand evidence in favour of the dialect contact and mixing hypothesis […] the speech of the first generation of New-Zealand-born English speakers demonstrates a very wide range of features from very many British dialects." (Trudgill 2004:14). In these dialect mixture situations, if the speakers have persistent contact then features from the original dialects may be retained or permanently changed, resulting in a new dialect.

Trudgill (2004) describes six integral processes of new-dialect formation: mixing, levelling, unmarking, interdialectal development, reallocation, and focussing. Mixing refers to the process described above whereby speakers from different dialects are must communicate with one another. Trudgill (2004: 6) presents evidence from South American Spanish of features which have come from both southern Spanish varieties, seen in the merger of /j/ and /ʎ/, and northern Spanish, such as the affrication of /tr/.

The second process, levelling, refers to the idea of reducing the number of variants from the original dialects. In the initial stage of dialect mixture there will be many different variants from the various dialects. As the dialect begins to level some of the original variants will be lost and others retained. This process of levelling, however, is not a random process, but rather depends on proportion of different dialect speakers (Trudgill 2004). Trudgill further explains that the proportion of dialect speakers does not lead to one dialect dominating over the rest. Instead what occurs is that one variant will dominate over the other variants. Although there may be many dialects in the dialect mixture, it is expected that some features will be similar and some different in these dialects. Therefore, it is more precise to say that the proportion of dialectal variants play a major role in the features retained in the new dialect.

Unmarking is the second form of variant reduction, which occurs in the new-dialect formation process. It is possible that the most frequent variant will not be retained if there is a more regular or simplistic form that exists, which is also in high proportions (Trudgill 2004).

Markedness deals with the naturalness of certain variants in languages. Roca & Johnson (1999: 508) define markedness in that "some feature combinations, whether paradigmatic (that is, within the same segment) or syntagmatic (that is, across segments), are less natural than others". As marked variants are supposedly less natural, they are found less in the world's languages. It is, therefore, quite probable that an unmarked feature would survive, as opposed to a marked feature.

Trudgill (2004) describes interdialectal development as forms which are not directly retained from any of the original dialects, but rather result from the interaction between the dialects. These forms can be intermediate variants between the original dialects (Trudgill 1986) or simplified variants, which are more regular than the contributing dialects (Trudgill 2004). He further suggests that hyperadaption is a form of interdialectal forms, specifically in relation to hypercorrection.

'Reallocation' is the next process described by Trudgill (2004) and the one that is of the most concern for this dissertation, as it is Trudgill's explanation for Canadian Raising. According to Trudgill (1986), reallocation is a complicated form of linguistic accommodation, whereby more than one competing variant is retained even after the levelling process. These remaining variants are then reallocated based on social class, style, or phonological conditioning (Trudgill 2004). As explained above, generally, when there is more than one competing feature in the source dialects, one feature will dominate over another. This can be seen by the intervocalic /t/ realisation in American English as a flap [ɾ]. At the time of formation of American English, the different dialect speakers in contact with each other would have had at least two distinct variants of intervocalic /t/ (Trudgill 1986). However, the flap, which likely came from rural dialects in the southwest of England, must have dominated over the other possible variants (Trudgill 1986), as shown by the observation that most American English speakers will produce an intervocalic flap. On the other hand, taking the same phonological element, intervocalic /t/, it is possible to see that Australian English has gone through reallocation. In Australian English two of the competing variants have been retained, [t] and the flap [ɾ]. Though the distribution of these realisations are unlike the variants for the PRICE vowel raising patterns in that they are stylistically governed rather than phonologically. Regarding Australian English, Trudgill (1986: 152) proposes "[t] being used in more formal styles, while in more informal styles [d̬] becomes increasingly likely". I will return to reallocation as it specifically relates to Canadian Raising following the description of new-dialect formation. Trudgill (2004) suggests that these five processes together form the process of koinéisation, which when combined with the final process of focussing makes up the entire new-dialect formation process. Focussing simply refers to the final process in new-dialect formation as it represents the stabilisation of a new dialect, where norms are accepted and stable throughout the community.

These six processes are only part of the new-dialect formation theory. There are also three chronological stages, which Trudgill (2004) proposes in order for the new-dialect formation process to be complete. The first stage of new-dialect formation is 'rudimentary levelling' (Trudgill 2004: 83). In this stage the dialect communities have first contact and mixing of the adult population. Trudgill describes that adults have limited linguistic accommodation skills. Therefore, in this first stage only the most robust dialect features especially those which impede intelligibility, are susceptible to levelling. These features are most likely to come from traditional varieties. New Zealand English provides a sound example of rudimentary levelling. The majority of the immigrants travelling to New Zealand would have had rural traditional dialects (Trudgill 2004). This being the case, it is interesting that Trudgill uses the study of the Origins of New Zealand English (ONZE) corpus to determine that the features of traditional varieties have disappeared in the new dialect. "There are very many features of nineteenth-century British Isles Traditional-dialects which are not even vestigially present" (Trudgill 2004: 91). That is to say that on the journey over to New Zealand some rudimentary levelling must have occurred.

Stage 2 of new-dialect formation details the dialect as it develops and determines the important role children play in dialect development. The linguistics accommodation and dialect mixing which took place within the adult generation in the first stage will create a vast amount of variability. Therefore, this linguistic system would be highly unstable and the generally accepted dialect diffusion principles seem to be modified. Although it is commonly accepted that children use the dialect of their peers, in an unstable dialect situation like dialect formation, the role a parent plays in the speech of their child is greatly enhanced (Trudgill 2004). Trudgill proposes that in this unstable linguistic environment, children are able to select variants from different dialects spoken by both their parents and peers. Even with the extensive variability, it is evident in the second stage that features are beginning to level and variability is less than that of the first stage. Trudgill (2004) names this process 'apparent levelling', which is distinct from levelling. In levelling it is shown that certain features are lost in order to accommodate. On the other hand, apparent levelling refers to the idea that children did not lose features, but rather never acquired the features in the first place.

Finally, the third stage refers to the stable state of the dialect. This stage involves the children of the previous stage reducing the minority forms and retaining the majority forms. Again New Zealand English is able to provide a compelling example of this stage of the process. It has been claimed in the past that New Zealand English is due to a massive immigration of from rural Essex, as many of the phonological features are similar (Trudgill 2004). However, Trudgill explains that New Zealand English appears to have many south-eastern English features because the variants of southeast English varieties "were also, coincidentally, very often majority forms in

the original dialect mixture" (Trudgill 2004:115). At the completion of the third stage and third generation of speakers a new dialect is formed.

Now that the process of new-dialect formations has been adequately covered, I return again to the question at hand the treatment of raising patterns in the theory of reallocation. As support for this theory, he states that "'Canadian Raising' […] occurs in *nearly every* form of non-creolised, mixed, colonial English outside Australasia and South Africa" (Trudgill 1986:160). Trudgill (1986) relies on the idea that Canadian English is a colonial variety which at the time of formation had a high degree of dialect mixture. In the initial stage, speakers were faced with a variety of realisations of the PRICE vowel with immigrants from Scotland, Ireland, and America. The two dominant variants were [aɪ] a feature of the American and Southern English dialects and [əɪ] from the Scottish and Northern English varieties. As both of these variants were quite prominent, neither dominated, instead speakers reallocated the two realisations in a complementary distribution. He further suggests that reallocation as opposed to levelling occurred as both variants are quite salient, partially due to their phonetic differences. Trudgill (1986) proposes that the variants were allocated to natural environments. These environments were motivated by articulatory pressures. That is to say, Chambers (1973) claims that raised variants are more likely to be found before a voiceless consonant, as English vowels are shorter in the pre-voiceless environment. In a centralised variant the articulatory distance between nucleus and offglide is shorter and therefore produces a shorter articulation than the non-raised variant. Consequently, in the present-day Canadian dialect [əɪ] now only appears before voiceless consonants. As further evidence of the Scottish dialects' influence on Canadian, Trudgill describes the use of 'pinkie' for 'little finger' which is not found in many British dialects Trudgill 1986: 159).

Similarly, Britain and Trudgill (2005) account for the raising pattern in central Fenland English as a case of reallocation (see a detailed description of the raising pattern in Section 1.3). In the mid-seventeenth century the Fenland was drained and land which was at one time uninhabitable saw an in-migration from neighbouring areas due to the highly fertile farmland (Britain and Trudgill 2005). This in-migration from the neighbouring areas ensured dialect contact and mixture, ultimately, leading to new-dialect formation. Britain and Trudgill describe how the creation of New Towns, like Peterborough continue to shape the linguistic features of the fenland dialect. Some features present in the central Fenland dialect help to establish that koinéisation has occurred. Specifically, Britain and Trudgill discussed the interdialectal form for the STRUT lexical set, which is realised as [ɤ] an apparent compromise between [ʊ] and [ʌ] (ibid 2005: 194). In particular with regards to the central Fenland raising pattern, Britain and Trudgill claim that there were two leading variants for the PRICE vowel at the time of dialect formation.

Mainly, the speakers from the east of the Fenland would have had a central onset diphthong while the western speakers had an open onset. Similar to the pattern for Canadian Raising, speakers reallocated the central variant preceding voiceless consonants and the open diphthong in all other positions.

Reallocation appears to be successful in explaining many phonological patterns, including PRICE vowel raising patterns. It is evident that reallocation is at least part of the explanation of raising patterns. In terms of the phonological patterns for the raising pattern in Liverpool English we must return to the dialect formation period to posit where the specific variants originated. Liverpool's dialect development is not a tabula rasa situation as Trudgill (2004) suggests was the case for the Canadian dialect. That is to say when the Canadian dialect was being formed there was no English dialect already present, and therefore, the dialect started from a blank slate. However, in the case of Liverpool there was already a small population with a stable Lancashire-Cheshire dialect when the new-dialect formation process began (Honeybone 2007). Honeybone suggests that although the Lancashire dialect originally spoken in Liverpool would have been part of the dialect mixture in the new-dialect formation, there were also a number of other large dialect groups contributing to the dialect mixture. A considerable in-migration from Ireland meant that a number of Anglo-Irish dialects formed a part of the dialect mixture (Honeybone 2007). While many of the Irish in-migrants were bilingual Irish Gaelic, Honeybone provides evidence that Irish Gaelic was not retained in Liverpool. It is possible to assume then that it did not play a significant role in dialect development.

Another substantial immigration came from Wales, with the population speaking both Welsh Englishes and the Welsh language, which Honeybone suggests is still spoken in some areas of Liverpool today. Finally, there was a substantial in-migration from Scotland with the Scottish population in Liverpool being the second largest in England (Honeybone 2007). These vast amounts of immigration into Liverpool provided a dialect mixture of the Lancashire dialect, Anglo-Irish varieties, Welsh-Englishes, the Welsh language, and Scottish dialects; all of which would have been involved in the eventual creation of the present day Liverpool dialect.

It is important to establish that features from the dialects proposed in the dialect mixture are present in the modern-day Liverpool dialect. Evidence of the retention of features from these dialects proposed as the composition of the dialect mixture helps to substantiate that the PRICE vowel realisations may have been retained from these dialects as well. In terms of the Northern English and Lancashire dialects there are a number of features, which appear in LE. Section 1.2 lays out a number of different phonological characteristics linking LE with northern English varieties. To review, Wells (1986) describes the velar nasal plus as a feature found in some north western varieties of English. While Honeybone (2004) mentions the non-shortening of /u:k/,

which he suggests is a characteristic of many Northern Englishes. Finally, the NURSE-SQUARE merger seems to be a feature that has come in part from the northern varieties. Specifically, Honeybone (2004) suggests this characteristic may have come from the Lancashire dialect. "There is a similar lack of contrast described for (only) Lancashire English in the SED" (Orton 1962; Orton, et al. 1978 quoted from Honeybone 2004: 8). On the other hand, according to Honeybone (2004) the Irish dialects may have also played a role in the NURSE-SQUARE merger.

Turning to the Irish dialects, it is evident that Irish-born in-migrants have influenced the development of LE. Honeybone (2004: 3) shows that Irish-born population between 1841 and 1881 ranged from 12.8% - 22.3%; a fairly substantial portion of the population. Considering this, it is unsurprising that there are some rather salient linguistic characteristics which may be traces back to the Irish influence. Honeybone specifically discusses the features of 'TH stopping' (described in Section 1.3) and the second person pronoun 'yous', referencing the Irish varieties as a possible origin for these features.

The remaining two dialects, Welsh and Scottish, do not seem to be as representative in LE. However, there are features which may be attributed to these varieties as well. Contemporary LE is a non-rhotic variety, as discussed in Section 1.2. Although there are many varieties in England which are non-rhotic it is particularly interesting that the Liverpool dialect is not, as most of the varieties contributing to Liverpool dialect formation are actually rhotic varieties (Honeybone 2004). Mainly, the northern English, Irish, and Scottish varieties are all rhotic. This being the case, it is possible that Welsh contributed the non-rhoticity aspect to LE. Wells (1986) describes that the majority of Welsh English dialects are non-rhotic, even though Welsh first language speakers may be rhotic.

One of the Scottish contributions to the present-day Liverpool dialect is closely related to the issue of rhoticity and the realisation of the /r/ in environments where it is retained. According to Hughes and Trudgill (1996) the tap [ɾ] is the most common realisation of the rhotic element in LE. It is likely that this feature entered LE through the Scottish dialect as the Lancashire and Irish rarely use this variant while "[ɾ] for the rhotic is (in contemporary varieties) most commonly reported for Scots varieties" (Honeybone 2004:7).

Having established that each of the varieties in the dialect mixture have influenced the development of the Liverpool dialect, I return to the PRICE vowel variants and the origins of each of the variants. The results of this investigation suggest that four PRICE vowel variants are used in the phonological patterns and therefore retained from the original dialect mixture. As described in Section 3.1 there is a raised nucleus variant, non-raised nucleus variant, lengthened nucleus, and monophthongal realisation. While, Knowles (1973) asserts that the non-raised

variant occurs in open syllables, this variant was also found to occur in the pre-voiceless environment in certain phonological patterns. There were too few open syllable tokens to make any generalisations, as mentioned in Chapter 3. Therefore, I will include Knowles (1973) description of the open syllable environment in the following discussion. Trudgill (2004) proposes that variants retained from the dialect mixture are often either majority realisations across the different dialects in the dialect mixture, the least marked variant, or an intermediate form. It is important to mention that because of the lack of information of precisely where the in-migrants came from, I will be considering different varieties within each dialect as it is likely that there were different varieties in play. For instance, when surveying the possible PRICE vowel variants for Irish in-migrants I have considered the rural varieties, Dublin accent, as well as other varieties. First we will turn to the raised variants found in the pre-voiceless environment.

The pre-voiceless raised variant seems to be the case of a majority realisation, as many of the varieties in the dialect mixture excluding Lancashire English may have had some raised variant in the PRICE vowel. There is no evidence of a raised variant in the areas surrounding Liverpool at the time of the SED (Cardoso 2011). It can, therefore, be assumed that the Lancashire English is did not contribute to this variant. However, there is some support that the raised variant may have come from a combination of the Irish, Welsh, and Scottish dialects, as well as the Welsh language. According to Hickey (2004) the 'popular Dublin' Irish dialect largely realises the PRICE vowel as [əɪ]. While Wells (1986) suggests that the Scotch-Irish areas have a similar pattern to the SVLR with one of the realisations as [əɪ]. Examples, such as *like* [əɪ] leads to the idea that this pattern is at least partially phonetically conditioned with the raised variant occurring before voiceless consonants (Wells 1986: 443). In terms of the Welsh dialect, Wells (1986) and Penhallurick (2004) assert that the Welsh English PRICE vowel in certain dialects will be realised with a centralised nucleus. Penhallurick suggests that these variants are found in the southern Welsh dialect, and further discusses Tench's (1989: 141 taken from Penhallurick 2004) proposal that the central variant may indicate areas where English was spoken earlier in Wales than areas with an open nucleus PRICE vowel. There is also a central realisation of the PRICE vowel exhibited in some varieties of the Welsh language. In the Swansea Valley lexical items like *cei*, and *neu* use the centralised [əɪ] as opposed to [ɛɪ] which is used in other varieties of Welsh (Wells 1986: 385). It has already been established in Section 1.3 that Scottish varieties have the SVLR phonological pattern which includes the PRICE vowel. This pattern has a centralised nucleus variant in the short environments. Given the proportion of dialects which may have had a centralised variant it is not surprising that this realisation was retained in the new Liverpool dialect.

Similar to the raised variant, the [aɪ] variant is a case where most of the varieties in the dialect mixture may have had this PRICE vowel realisation. This is somewhat expected as this particular variant is generally used as reference for the PRICE vowel, and therefore may also be a case of retention as it is an unmarked variant. In terms of the original dialect mixture, the SED clearly demonstrates that at the time of the formation of the Liverpool dialect many of the surrounding localities would have had this realisation in the PRICE vowel (Cardoso 2011). Specifically, three of the localities surveyed, two of which are located closest to Liverpool, produced this variant the majority of the time for the PRICE vowel. Cardoso (2011) even suggests that this variant may have come through the Lancashire dialects into Liverpool English as this realisation was quite dominant in the area. It must be said that there is some variation in the backness of the nucleus, having both [a] and [ɑ]. While it is very likely that the Lancashire dialect contributed to the retention of this vowel, there is also evidence from Irish that suggests it may have been an influence. According to Hickey (2004), the rural north and parts of the south of Ireland variably realise the [aɪ]. In fact, in the rural north this variant actually occurs in the pre-voiced environment (Hickey 2004: 91). The PRICE vowel in the northern varieties of Welsh English will also use this variant (Penhallurick 2004). Penhallurick describes that the traditional rural PRICE vowel variant for Welsh English is [aɪ]. Even in areas where the central variant occurs the open realisation seems to be present. Some debate exists about whether the raised and open variants have a phonemic distinction in places where both variants are present (Wells 1986, Penhallurick 2004). Wells (1986: 385) demonstrates this possibility with the minimal pair *eye* [əɪ] and *aye* [aɪ]. The Scottish dialect does not appear to have influenced this variant as it does not generally have this variant.

The third variant to consider is the lengthened nucleus variant before voiced obstruents. This vowel variant does not appear to have come from the Lancashire or Welsh dialects as neither of the dialects have this variant. However, turning to both the Irish and Scottish influences, we can see possible origins of this variant. Wells (1986) discusses the variants of the PRICE vowel in Ulster and Scotch-Irish dialects include realisations with half or full length nucleus. More specifically, Scotch-Irish dialects seem to have variation between the centralised realisation and a lengthened nucleus variant (Wells 1986: 376). Wells explains that these two realisations occur in different environments without making reference to the specific environments. There is an implication that the environments are not solely phonetically conditioned, but may also be affected by some other factors. This is shown through the minimal pair example presented by Wells (1986 taken from Gregg (1964: 173) of *lie* (fib) [əɪ] and *lie* (recline) [a:e]. Notice that the glide does not correspond exactly to the variant representation used in this dissertation. However, as mentioned previously, the precise realisation of the glide was not considered in the results of

this study. Likewise, there is a lengthened variant present in Ulster dialects. The phonetic range of the PRICE vowel in Ulster is [æ˚ɪ] to [eɪ], according to Wells (1986: 443). One of the obvious issues with this particular variant is that the nucleus is produce farther forward than the variant proposed for LE. Perhaps within this variant there is another type of accommodation occurring. Specifically I propose that there may have been a slight adjustment of the nucleus in order to remain consistent with two of the other three variants: [aɪ] and [a:]. Furthermore, both the Scotch-Irish and Scottish variants have variants with the realisation found for LE. In Scottish dialects, McMahon (2000: 150) uses [a:ɪ] as the variant occurring in the long environment for the SVLR. In both the Scotch-Irish and the Scottish realisations there seems to be a difference in the length of the nucleus compared to the lengthened nucleus variant suggested in this dissertation. It is possible that there has been some accommodation to allow for the [aɪ], [a˚ɪ], [a:] to be a natural progression. On the other hand, it is also possible that there is actually no difference in the length of the nucleus. Instead it could be that what I considered to be half lengthened McMahon (2000) considered a full length; potentially there is no phonetic difference. In order to adequately determine which of these two hypotheses are correct it would be necessary to have detailed spectral analysis of the Scottish PRICE vowel to compare to the Liverpool data. If there was a significant difference in the length of the nucleus between the two dialects, then the first theory is likely to be correct. However, if there is no significant difference, then the second proposition is more likely to be correct.

Finally, I will consider the origin of the monophthongal variant preceding nasal consonants. Lancashire English will likely have had an influence on this PRICE vowel variant. Cardoso (2011) demonstrates that two of the five localities from the SED have an almost fully monophthongal vowel system. In Eccleston, Cardoso (2011: 6) finds that monophthongs were used 75 per cent of the time. Whereas, speakers in Harwood produced monophthongs 81 per cent over all the tokens surveyed (Cardoso 2011: 6). These two localities demonstrate that there would also have been a substantial amount of monophthongs present in areas around Liverpool at the time of dialect formation. There also may have been a small contribution from Irish dialects with regards to the monophthong. Wells (1986: 444) mentions that Anglo-Irish speakers will have a monophthongal realisation preceding the rhotic consonant, providing the example of *fire* [fa:əɪ].

Now having established the possible origins of each of the four PRICE vowel variants, it is integral to explain the reasons for each of the variants being reallocated to their ultimate environment. For this discussion, I will use phonological pattern 1 for the environments and variants with the addition of Knowles (1973) [aɪ] variant in the open syllable. As Trudgill (1986) suggests each of the variants will have been reallocated to the most natural environment. That is to say, the raised realisation occurs before voiceless obstruents due to the shorter articulatory

distance between the nucleus and the offglide. In terms of the open diphthong [aɪ], Cardoso (2011) demonstrates that all of the localities, even the ones with a dominant monophthongal system, show a preference for the diphthong in open syllables. Again taking Trudgill's (1986) idea that the voiced environments allow for a longer articulatory distance between the nucleus and offglide, it is possible that the lengthened nucleus variant was the most natural candidate. While this does partially explain why the variants are reallocated to their ultimate environments, it is not entirely satisfactory. For instance, if the only factor that conditions the pre-voiceless environment is the articulatory distance between the nucleus and the offglide, then it would seem that the most natural candidate for that environment is the monophthong. The monophthong although lengthened would still be quickest to produce in the voiceless environment as there would be no movement to the offglide. In order to more adequately explain why the voiceless environment is the most natural for a centralised variant we must now turn to the final theory being evaluated in this dissertation.

Moreton and Thomas (2004), from a phonological background, posit the theory of 'asymmetric assimilation' in order to account for Canadian Raising. Though I suggest that instead of accounting for the origins of the phonological patterns, Moreton and Thomas provide a plausible explanation for why it appears that central variants occur in the pre-voiceless environment and other variants occur in the other environments, which Trudgill (1986) lacks. Taking into account numerous varieties of English which have some form of variation in the PRICE vowel, Moreton and Thomas find that the pre-voiceless variant is never phonetically lower in vowel height than the pre-voiced realisation. There is always some element, either the nucleus, offglide or both which is higher in vowel height in the voiceless environment than the variant in the voiced environment. Moreton and Thomas (2004: 3) state that "[t]he nucleus and offglide of /ai/ place conflicting demands on the tongue body, more so than any other English vocoid". As a result of this there are many dialects which undershoot on one or both of the components, usually affecting the offglide (Moreton and Thomas 2004). Yet the voiceless coda environment has a tendency to adjust the nucleus and not the offglide. This leads to the idea that the pre-voiceless environment shields the offglide allowing the nucleus to change. There are two reasons for this according to Moreton and Thomas (2004).

Firstly, Moreton and Thomas (2004: 3) suggest that voiceless codas influence the F1 and F2 frequencies of the offglide so that the "[l]ow F1s are lower, high F2s are higher, and low F2s are lower" producing a peripheralisation of the offglide. Although the precise reason for this is unknown, Moreton and Thomas propose that it is related to the lowering of monophthongs, which occurs in pre-voiceless environment. The second support relates to the previously mention well-documented shorter vowel duration before voiceless consonants than voiced (Moreton and

Thomas 2004). This is particularly the case with the PRICE vowel, as Thomas (2000) supplies evidence that the PRICE vowel in the pre-voiceless environment has a shorter nuclei and longer offglide, but the inverse for pre-voiced PRICE vowels. Both of these factors then lead to the hypothesis that the raised nucleus in pre-voiceless environments are the result of assimilation of the nucleus to the offglide, as the nucleus is more vulnerable to assimilation than the offglide. This explains why the centralised variant in Liverpool English occurs in the pre-voiceless environment and not the monophthong. It also helps to understand that the other three variants are in pre-voiced environments. As the pre-voiced environment has an entirely contrary affect, the offglide assimilates to the nucleus, leaving the offglide more vulnerable to change (Moreton and Thomas, 2004).

Specifically, in the case of Canadian Raising, Moreton and Thomas propose that the opposing forces that the voiced and voiceless environments have ensure that the pre-voiceless PRICE vowels will be slightly higher than pre-voiced ones. This leads to subtle changes in each new speaker generation due to misinterpretation of the PRICE vowel (Moreton & Thomas 2004). It then follows that Canadian Raising in its beginning stages involved a slight difference between the realisation in the voiceless and voiced environments. With each new set of learners and misinterpretations the pre-voiceless PRICE vowel nucleus began to get higher in vowel height, while the pre-voiced variant's nucleus remained lower.

In terms of the theory that Canadian Raising has developed from asymmetric assimilation, there are a number of issues. Firstly, if this pressure exists to over time change the pre-voiceless PRICE vowel variant it is possible that the process would continue until the nucleus has disappeared completely or that there is almost no distinction between the nucleus and offglide. However, this is the not the case. Canadian Raising and many other PRICE vowel raising patterns have clearly stopped at some point. Interestingly, most of the resultant variants can be traced back to some dialect known to be part of the original dialect mixture. The second issue, and perhaps more problematic one, is that not all varieties of English have a raising pattern. Moreton and Thomas (2004) do not provide any explanation for why raising patterns are not found in all or most varieties of English. If the pressure of the voiceless environment is the only factor in developing a PRICE vowel raising pattern, then it would be realistic to assume that most varieties would have this pattern. In fact, when researching different PRICE vowel raising patterns it is obvious to see that there must be a new-dialect formation in order for this to occur. Given this, it is important to understand that Moreton and Thomas (2004) have provided a vital part of the PRICE vowel raising pattern in accounting for why we see the centralised variants in pre-voiceless environments and non-centralised variants elsewhere and why these are the natural environments. However, we must also necessarily have a new-dialect formation process

occurring in order for a raising pattern to be found in a dialect. Furthermore, there must not only be a new-dialect formation but also without the process of reallocation we would not see the development of a raising pattern. If one variant merely dominated over another there is no reason for a raising pattern to occur.

I must now turn again to historical linguistics in order to explain the final issue with raising patterns. It is clear that the various realisations in a raising pattern come from the new-dialect formation and that they are allocated to natural environments based on asymmetric assimilation. However, I have not yet referenced why the variants have different realisations in the original dialects. It is fairly well-accepted that the PRICE vowel in different varieties of English exhibit different stages of development of the GVS. "The chief stages in the development of ME **ī** to the present sounds are almost automatically suggested by its correspondences in the living dialects" (Wolfe 1972: 10). Through the study of Northern varieties of English Orton (1933) shows the stages of development of the GVS, including an innovative stage with a monophthong. Gregg (1973) using similar ideas to Orton, posits that the diphthongisation of ME **ī** began in the Southern areas of England and spread to the North. This can be seen in that most of the Southern varieties use PRICE vowel variants which are very likely to be the end stage variants of the GVS while in the North there are more variants in pre-final GVS stages. Furthermore Trudgill (1986) admits that although Canadian Raising is not a consequence of the GVS, raising patterns like other sound changes are very complex and may have a number of factors contributing to the development. Therefore, I propose that the variants in the original dialect mixture are realisations which reflect different stages of the GVS. As shown above, this is not a novel concept. In fact, in regards to Scottish varieties, McMahon (2000) proposes this very explanation for the PRICE vowel in the SVLR. According to McMahon the SVLR initially affected only the monophthongs. That is to say, the PRICE vowel variants were present before it was incorporated into the SVLR. Further to this McMahon (2000: 175) claims that the PRICE vowel had "a pre-existing quality difference reflecting earlier and later reflexes of original /i:/". While this is most likely the case, it is interesting to note that McMahon (2000) earlier in this work describes a number of different languages and varieties which would have affected the development of Scottish English. Therefore, although the variants are again historically motivated, it is also possible that they are present in Scottish English due to language and dialect contact. In other words, dialects with only one PRICE vowel variant demonstrate the various stages of the GVS, whereas dialects with more than one PRICE vowel realisation are most likely the result of reallocation.

When proposing the origins of a phonological patterns, it is integral that an explanation takes into account all of the aspects of the phonological pattern. Often times a linguist will

endeavour to explain the origin of a phonological pattern within the bounds of one of the subfields of linguistics. In the case of the theories evaluated above each theory uses one of three subfields, mainly historical linguistics, dialectology, or phonology, in order to explain Canadian Raising. However, each of the theories seems insufficient in some form or another. Therefore, I have proposed that in order to fully account for the PRICE vowel raising pattern in the Liverpool dialect, as well as, Canadian Raising, all three of the subfields must be considered in the final theory. In that way I show that the actually PRICE vowel variants come into LE through the dialectological theory of reallocation presented by Trudgill (1986, 2004). The explanation of why the variants eventually fall into their natural environments rests on Moreton and Thomas' (2004) asymmetric assimilation hypothesis from a phonological perspective. A new-dialect formation situation must occur in order for a raising pattern to potentially occur. Finally the origin of the original dialect PRICE vowel variants is explained through historical linguistics and the GVS.

6. Conclusion

PRICE vowel phonological patterns have interested linguists for decades, including research on Canadian Raising (Joos 1942, Chambers 1973), central Fenland raising (Britain 1997, Britain and Trudgill 2005), and SVLR (Aitken 1981, McMahon 1991, 2000). Knowles (1973) first introduced the possibility of a raising pattern in the Liverpool dialect. While other notable linguists working with the Liverpool dialect have also indicated that there is a phonological pattern occurring in the PRICE vowel (Honeybone 2004, Watson 2007). The purpose of this dissertation was to determine the precise phonological facts of the Liverpool PRICE vowel raising pattern through the use of corpus phonology, and to evaluate the effectiveness of using pre-existing corpus in phonological analysis.

Through the use of auditory judgements and spectral analysis on 709 tokens from 35 informants living in Liverpool and Merseyside I was able to support the previously made claim that there is a PRICE vowel raising pattern in the Liverpool dialect. More specifically, I found that there are five phonological patterns using a combination of four difference phonetic variants of the PRICE vowel. These variants are as follows: raised nucleus [əɪ], non-raised [aɪ], lengthened nucleus [a˚ɪ], and monophthong [a:]. This result is somewhat surprising given the other well-researched PRICE vowel phonological patterns, such as Canadian Raising and central Fenland raising, which have one clear phonological pattern with two variants. One suggestion for the existence of five phonological patterns is that there is a current phonological change in progress headed by the younger female population. Therefore, although at the time of dialect formation the phonological pattern went through the focusing change, there is a new endogenous change occurring.

Within the five phonological patterns, two phonological patterns emerge as the most frequently used among the informants. In terms of actual vowel variants, the most common of the phonological patterns has a raised variant in pre-voiceless environment, lengthened nucleus realisation before voiced obstruents, and a monophthong in the pre-nasal environment. Interestingly, the second most common phonological pattern is quite similar to the first with a lengthened nucleus realisation in the pre-voiced obstruent environment and a monophthong before nasal consonants. It differs in the variant before voiceless obstruents, which is the non-raised variant [aɪ]. Phonological patterns 3, 4, and 5 are used much less frequently by the informants in this study. The phonological patterns 3 and 4 consist of monophthongal variants in the pre-voiced obstruent and pre-nasal environments. There is a raised nucleus realisation before voiceless obstruents in phonological pattern 3. Conversely, phonological pattern 4 uses a non-raised variant in the pre-voiceless environment. The final and least common phonological pattern

contains the non-raised realisation in the pre-voiceless environment, and the lengthened nucleus variant before voiced obstruents and nasal consonants. Furthermore it was found that there is no phonological pattern with a raised nucleus variant in the pre-voiceless environment and a non-monophthong before nasal consonants. Nor is there a phonological pattern that has a monophthong in the voiced obstruent environment without a monophthong pre-nasal.

Aside from the phonetic details of the phonological patterns, there were a number of sociological factors used to determine if any of the phonological patterns are used by informants based on gender, age, or location. It is found that phonological patterns 3 and 4 are exclusively used by younger females. More specifically, phonological pattern 3 is produced solely by female informants under the age of 24, while phonological pattern 4 is used by female participants under the age of 47. Recent studies suggest that the Liverpool dialect is spreading into the Merseyside. I decided to include informants from both Liverpool and Merseyside. The only observable difference between the Liverpudlian and Merseyside informants is that none of the Merseyside informants showed a preference for the raised nucleus variant. In fact, no Merseyside informant exhibited a phonological pattern including a raised nucleus variant. On the other hand, the Liverpool informants produce all five of the phonological patterns.

There is a small scale real time study using the SED and LB samples presented in this dissertation. One of the localities surveyed in the SED is Halewood, which coincidentally is the same location for the LB participants. At the time of the SED Halewood showed a predominately diphthongal phonological system with no raised nucleus variants. Although there was a great deal of phonetic variation, it was mainly based on the nucleus' backness of the diphthong and the degree of nasalisation. In comparison, the LB samples showed a jump to 25 per cent monophthongal production from 4 per cent and the raised nucleus variant is used in 19 per cent of the tokens. In over a fifty year period, the phonological variants for the PRICE vowel in Halewood have drastically changed. This perhaps suggests that the phonological characteristics of the Liverpool dialect have migrating into the periphery of Liverpool and into Merseyside in the past fifty years.

The secondary aim of this dissertation is to provide an evaluation of the efficiency of corpus samples compared to elicited speech. When choosing to use corpus speech samples, whether they are pre-existing or not, an issue which can arise is an insufficient number of tokens for a particular environment. It is not possible to make substantiated claims about a phonological pattern without a certain number of tokens. For this study there were an adequate amount of tokens for the pre-voiceless, pre-voiced obstruent, and pre-nasal environment. However, the before laterals, rhotics, vowels and in open syllable environments had too few tokens in order to make any claims about the PRICE vowel variants. Furthermore, only 21 of the 35 informants had

a sufficient number of tokens in the voiceless, voiced and nasal environments to be classified into phonological patterns. It is also often suggest that pre-existing corpus samples will not supply enough informant metadata for a proper sociological investigation. This was also not the case for this study as the vast majority of speech samples had informant metadata. Finally, another commonly asserted issue with using pre-existing corpus speech samples is the possibility that speech samples will not provide a representative sample of the population. While this is a potential problem, with regards to this specific investigation the speech samples are fairly well distributed in terms of sociological attributes. There are a total of 35 informants in this study, 18 male and 17 female, ranging in age from 18 – 90. The age groups are also fairly evenly divided with 11 informants 18-29 years of age, 13 informants 30-59 years of age, and 9 informants 60+. In terms of location there are 26 speakers from Liverpool and 9 from Merseyside. The use of corpus samples in general in this study has been quite successful. While there are definite drawbacks, such as insufficient tokens in certain environments, corpus samples seem to provide a good basis for phonological study.

While this dissertation provides an evaluation on corpus samples, it is also possible to assess the extent to which elicited speech data reflects natural speech. Corpus phonologists have suggested that elicited speech is not able to provide an accurate representation of natural speech, often asserting that elicited speech is hyperarticulated (Cole and Hasegawa-Johnson 2010). The findings of this study suggest that the extent to which elicited speech is representative of natural speech depends on the method of elicitation. The IDEA samples have both elicited and conversational speech. None of IDEA informants show different phonological patterns from the reading passage to the conversational speech. However, in the case of the LB samples which including two types of elicited speech – word list and reading passage – many of the informants show a difference phonological patterns depending on the elicitation task. The pattern in the word lists tend to be phonological patterns more similar to reference varieties. LB8 is the best example of this. In the word list this informant did not have a raised or monophthongal variant. Conversely, in the reading passage LB8 had both a raised and monophthongal realisation. Therefore, I am suggesting that while word lists seem to produce unnatural speech, reading passages seem to be consistent with the conversational speech.

Although the phonological patterns in LE are not found in whole in any other known variety, all of the variants and their environments are produced in PRICE vowel raising patterns in other varieties of English. The raised variant in the pre-voiceless environment is found in Canadian Raising and Central Fenland raising. Raising patterns for some Caucasian speakers in the southeast United States use a non-raised variant before voiceless consonants (Moreton and Thomas 2004). McMahon (2000) suggests a lengthened nucleus variant for the long

environments of the SVLR. In terms of the monophthongal realisation, there is a monophthongal variant in the elsewhere environment in the Central Fenland raising pattern (Britain 1997). In terms of the whole phonological pattern, there is one raising pattern in Eastern Virginia which is similar to phonological pattern 1 with a raised variant in the pre-voiceless environment and a monophthongal variant in the pre-voiced environment.

Finally, I evaluated three theories on the origins of PRICE vowel raising patterns, each of which stems from a different subfield of linguistics. It is clear that none of the theories are able to adequately account for all aspects of raising patterns by themselves. However, when the different theories are combined it is possible to provide an explanation of the origins of raising patterns. Trudgill's (1984, 2004) theory of reallocation within new-dialect formation provides an explanation for the development of raising patterns as well as where the different variants have come from. Asymmetric assimilation (Moreton and Thomas 2004) provides a well-founded justification for the placement of variants in their natural environment. Through the use of historical linguistic and the GVS (Gregg 1973), the final question regarding the origin of raising patterns is answered. While raising patterns must develop from a new-dialect formation situation, it is clear that the variant from the original dialect mixture are a reflex of earlier stages of the GVS.

While this corpus phonology approach on the PRICE vowel raising patterns in LE has been fairly successful, there is still a great deal of work to be done in the area. As described above, there were a number of environments not reported on due to an insufficient number of tokens. It would be prudent to develop either a larger corpus or an elicitation task geared toward discovering the variants which occur in those environments. Furthermore, a larger sample size is needed in order to determine the frequency of the phonological patterns and whether the correlations with age and sex found in this study will be further substantiated. Finally, many raising patterns in different varieties of English include the MOUTH vowel. Future investigations should endeavour to include the MOUTH vowel, as it has been suggested to be a part of the LE phonological pattern.

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Laura Berry samples were provided via file transfer. [accessed October 13 2010]

Appendix

Table 1. Range of PRICE vowel alternations in different varieties of English (Moreton and Thomas 2004: 23 description: “Height alternation in /ai/ conditioned by voiceless (–) versus voiced (+) coda obstruents. (Other environments, such as nasal and zero codas, were not reported by all sources.”)

/ai/ alternants				Dialects
ʌɪ	aɪ	aɛ	aˤ a:	
–	+			Canada (Joos 1942, Chambers 1973, Paradis 1980) North-central U.S. (Dailey-O'Cain 1997, Thomas 2000) East coast of U.S. (Labov 1963, 2001) Low Country of South Carolina and Georgia (Kurath & McDavid 1961) South Atlantic islands (Trudgill 1986) English Fens (Britain 1997)
–		+		Southeastern U.S. (Greet 1931, Kurath & McDavid 1961)
–			+	Eastern Virginia, northeastern North Carolina (Kurath & McDavid 1961)
	–	+		Southeastern U.S. white (Edgerton 1935, Hall 1942, Sledd 1966)
	–		+	Detroit African-American English (B. Anderson 2002) Southeastern U.S. white speakers (Evans 1935, Sledd 1966, Bailey et al 1991, Bernstein 1993) Devonshire (P.Anderson 1987) Humberside (Trudgill 1999:72)
		–	+	Texas African-American English (Bailey & Thomas 1998)
±				Hertfordshire, Worcestershire, Norfolk (Orton et al. 1978)
	±			Texas Mexican-Americans (Thomas 1995, 2000)
		±		Texas Anglos (Bailey et al. 1991)
			±	Western North Carolina white speakers (B. Anderson 1999) Texas Anglos (Bernstein 1993)

Table 2. Summary of Informant Metadata (IDEA 2010; LB 2009; BL 2010; BBC 2010).

Informant	Gender	Age	Location	Years in Area	Occupation	Interviewer (In) or Informant (Sp) Comments
ID16	Male	31	Liverpool	30	catering manager	"ex. of a true Scouser" (In)
ID17	Female	51	Liverpool	-	cashier, previously assistant cook	"nervous", "well-spoken scouser" (In)
ID18	Female	31	Liverpool	28	actress, teacher	"excellent example of a Scouse" (In), "entire family is from Liverpool" (In)
ID44	Female	41	Kirkdale, Liverpool	23	wife of footballer	"middle-class Liverpool accent" "mild accent"(In)
LB8	Male	60	Halewood, Liverpool	40	-	-
LB10	Female	22	Halewood, Liverpool	22	-	-
LB11	Female	24	Halewood, Liverpool	21	-	-
LB12	Female	19	Halewood, Liverpool	19	-	-
LB13	Female	50	Halewood, Liverpool	25	-	-
LB14	Female	22	Halewood, Liverpool	22	-	-
LB15	Male	25	Halewood, Liverpool	15	-	-
BL1	Female	42	Birkenhead, Wirral	-	housewife	-
BL2	Male	80	Birkenhead, Wirral	-	carter, forklift driver	-
BL3	Male	90	Liverpool	-	jack of all trades	
BL4	Female	71	Liverpool	-	pools clerk, barmaid	-
BL5	Male	71	Liverpool	-	teacher	-
BL6	Female	47	Speke, Liverpool	-	housewife	-
BBC1 S1	Male	24	Moreton, Wirral	24	student	"common" dialect (Sp)
BBC1 S2	Female	24	Woodchurch, Wirral	24	student	"light scouse, not as strong as Liverpool" (Sp)
BBC2 S1	Female	25	Wallasey, Merseyside	25	student	"plastic scouse" (Sp)
BBC2 S2	Female	26	Wallasey, Merseyside	26	student	"quite strong" (Sp)
BBC3 S1	Male	63	Walton, Liverpool	+16	educational planner	"Liverpudlian - working class" (Sp)
BBC3 S2	Male	53	Liverpool	7 - 11	treasurer of initiative factory	"scouse" (Sp)
BBC3 S3	Male	62	Liverpool	62	ageism project co-ordinator	"scouse" (Sp)
BBC3 S4	Male	68	Lydiate, Liverpool	+16	account assistant	"regional - Liverpool" (Sp)
BBC4	Male	52	Anfield, Liverpool	11 - 17	labourer	"scouse" (Sp)
BBC5 S1	Male	n/a	Liverpool	n/a	ex-docker	-
BBC5 S2	Male	n/a	Liverpool	n/a	ex-docker	-
BBC6 S1	Female	50	St. Helens, Merseyside	+16	housewife	-
BBC6 S3	Male	68	St. Helens, Merseyside	68	retired	-
BBC7 S1, BBC8 S1	Male	46	Garston, Liverpool	9 - 16	self-employed	husband (In), "scouse"(Sp)
BBC7 S2, BBC10 S2	Female	18	South Garston, Liverpool	9 - 16	student	daughter's friend (In), "scouse" (Sp)
BBC7 S3, BBC8 S2	Female	41	Garston, Liverpool	9 - 16	project co-ordinator	wife (In), "scouse" (Sp)
BBC7 S4, BBC8 S3, BBC10 S2	Female	19	Garston, Liverpool	19	student	daughter (In), "scouse" (Sp)
BBC9	Male	58	St. Helens, Merseyside	58	Centre manager	-